IRON AGE

THE NATIONAL METALWORKING WEEKLY A Chilton Publication SEPTEMBER 14, 1961

★ Steel Engineers' Feature:

Steelmaking Enters Greatest Decade of Change p. 169

Markets Shape New Steel Products p. 139

How to Weld Steel to Aluminum p. 181

Digest of the Week p. 2-3

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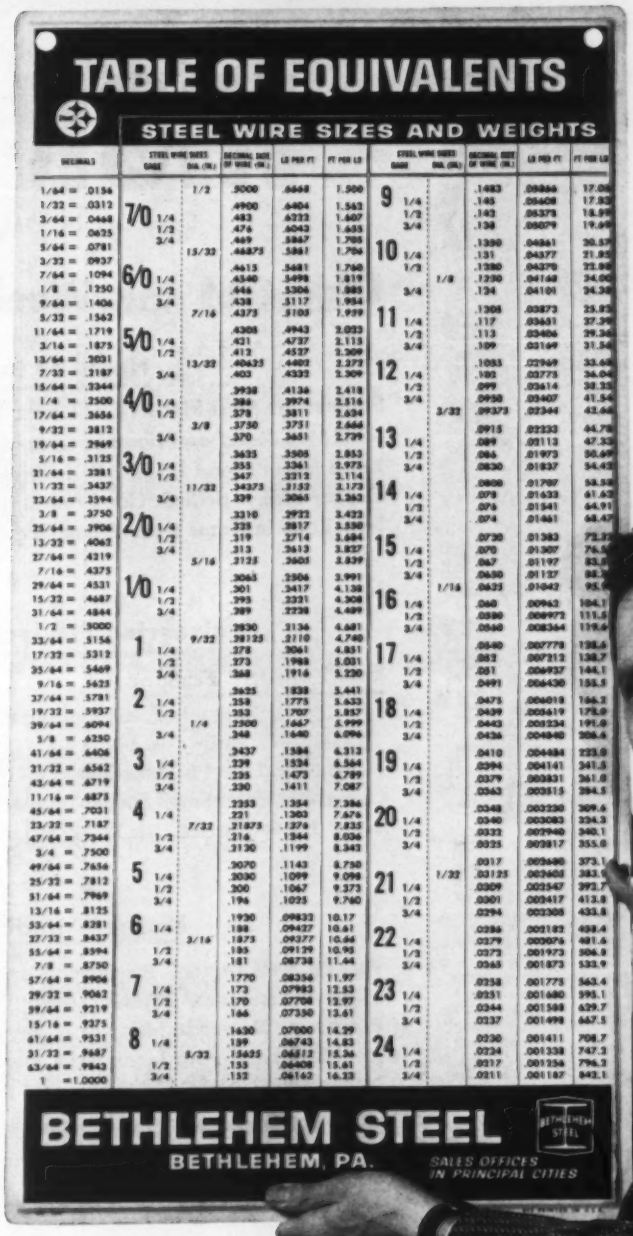

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IRON AGE

September 14, 1961—Vol. 188, No. 11

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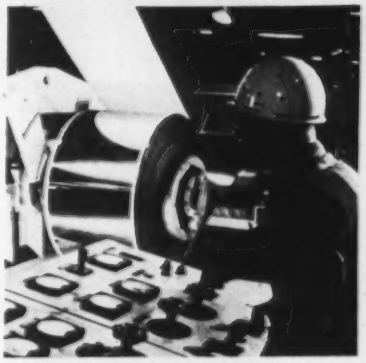
Special This Week

Steelmaking Shapes Nation's Future

This week's special full-color report is the third in a series on Metalworking's Technological Explosion. The steel industry is headed into its greatest decade of change. Many drastic revisions are already well along. Our cover photo shows the teeming of a ladle of steel at the Bethlehem Steel Co. p. 169



New Mill Products Meet Challenges

Steelmakers are hitting back at keener competition. The mills have lightened, brightened, and widened product lines for all markets. Steel's product technology spurt has been across the board, taking in less costly, as well as costly, grades. p. 139

Kennedy Attacks Steel Prices

Steel leaders think President Kennedy's warning not to raise prices was a blow below the belt. Most believe that three years of not raising prices is restraint enough. Furthermore, the question of next year's labor negotiations is far from answered. p. 143

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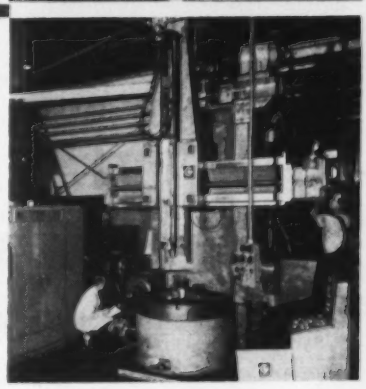
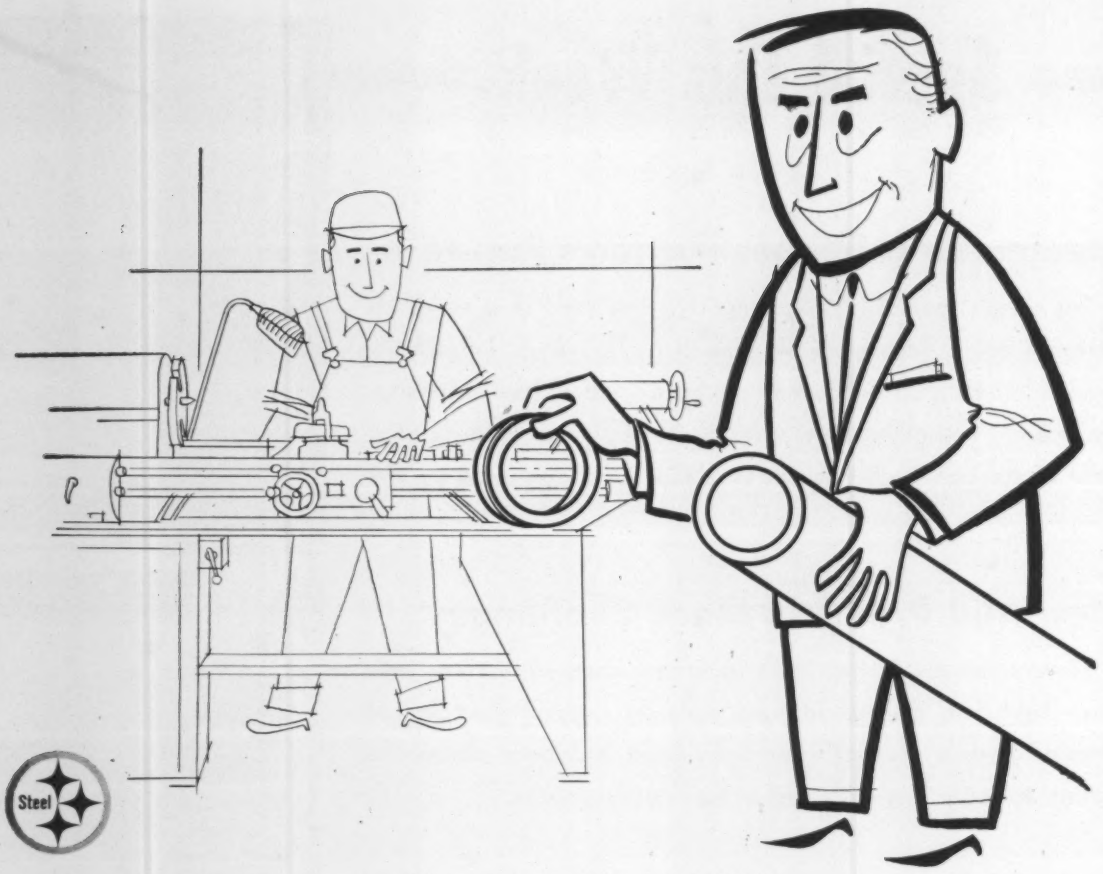


Capital Goods: Slow, Steady Comeback

As yet management shows no strong signs of letting loose a flood of new funds for future plant and equipment spending. But the most recent survey shows the rate of new capital appropriations is rising. And selected industries are making bigger plans.



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The Steel Industry: Resister of Brickbats!

When detractors, Congressmen, soap box orators, and union leaders need a patsy, they always have the steel industry handy.

Let there be danger to the nation and who gets blamed? The steel industry! If there is a whisper that steel ought to make a profit and that a price increase might be needed, what happens? All hell breaks loose in Washington.

Let paper, cardboard, aluminum, cigars, milk, a haircut or almost anything else go up in price, and the silence is deafening. Boost steel a couple of bucks a ton and everyone gets in the act.

Let a steel firm just hint that it might like to merge with another firm having troubles so both can exist, and powie! Anti-this-that-and-every-other-thing.

Talk about need for money to buy equipment so wage demands can be met and what do you get? You get arguments that wages can go up but prices can't. "So chew on that awhile," say the "experts" on how-steel-should-be-run.

But what effect has all this on the good old industry which is now showing signs of a fabulous rejuvenation?

A pepup that comes in the face of high costs, export-import neurosis, and a competition from other materials that is rugged and sharp;

A research program among steel companies which far surpasses in cost, capital spent for that purpose only a few years ago;

A sales and market research program which adequately supplements experience of salesmen;

A variety of quality steels to meet current and future demands;

A broadness of thinking that transcends the stark individualism of the past;

A new brand of officials who work as if they would be fired if they don't find answers to problems of cost, sales, and research.

But is this something new? It is something new in that it is a mature phase of an industry that was, is, and always will be a basic one. It will continue to draw lightning from unions, from Washington, and from uninformed critics. But today that is expected. Past reactions of wrath and unbridled indignation have subsided.

Now the fight for sales, for fair government treatment, for reasonable labor contracts—and the fight to survive—will be vigorous, unrelenting, and interesting.

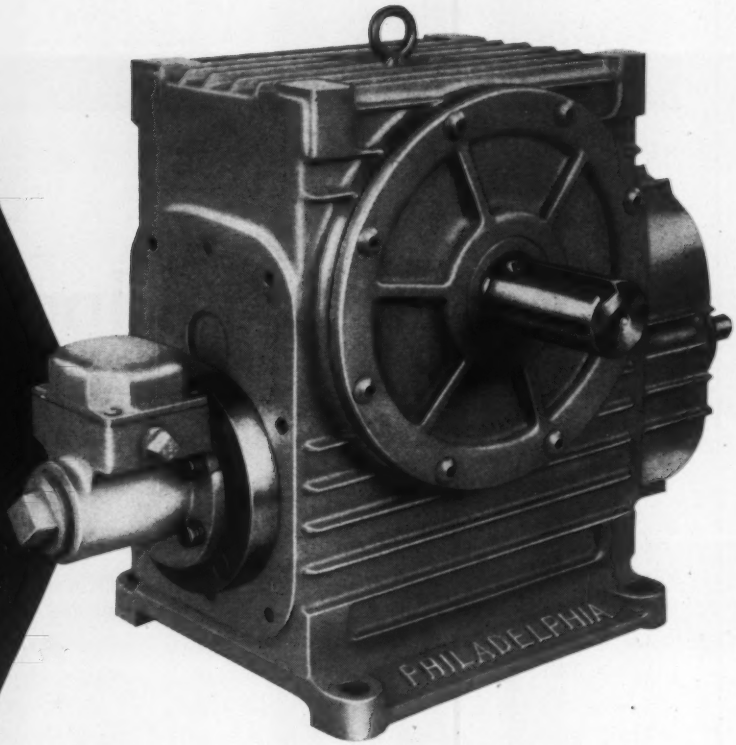
It is far too early to bury the steel industry—or to refer to it as a has-been. Something new is brewing!

Tom Campbell

Editor-in-Chief

INSIDE!

AN AUTOMATIC SWITCH FOR FAST, SURE PROTECTION AGAINST OVERLOAD



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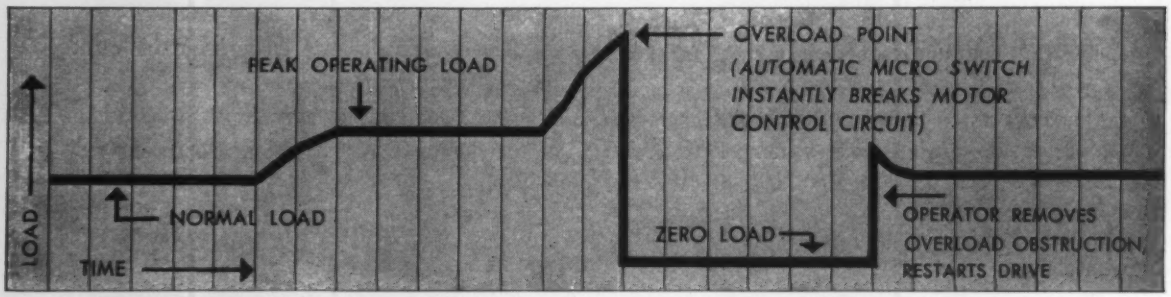

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Inventories At Turning Point

A July rise of $200 million in durable goods stocks snapped a run of 10 months where inventories either

fell or remained at previous month levels. July inventories totaled $30.4 billion.

Most of the July rise in stocks centered in primary metals (chiefly ferrous), electric machinery, aircraft and fabricated metals.

A further rise in inventories is indicated as inventories are still low in relation to sales. The year-ago inventory-sales ratio was 2.23 in durables. The latest ratio is 2.04. And sales gain rates exceeded stock gain rates. Further, broadening recovery will give a solid boost to stocks.

Who Determines "Fair" Prices?

In an ultimate sense, the jury that sits on "fair" price questions is not the government. It is the public.

Current government hints, threats and pressures to keep prices in line are blurring this true picture.

This is pointed out by one of the nation's top psychologists, George Katona. He states: "In recent years of slowly rising prices, people considered the prices unjustified, resented them, and reacted by postponing some of their discretionary purchases."

Business success is still based on "market" pricing.

Keep An Eye On Trade Balance

The foreign trade balance is a small dark cloud on the business horizon that is getting increasing attention from long-range planners. No storm warnings yet. But planners know stepped-up foreign aid must be largely underwritten by a bigger trade balance. And the balance is currently swinging in the wrong direction.

Exports dropped by $1.2 billion from the first to the second quarter. Imports rose by $200 million. This is after allowance for seasonal factors.

A favorable trade balance is still expected this year. But part of this favorable showing will be due to a $700 million in debt payments from overseas.

And as U.S. business improves, there will be an increase in imports, chiefly raw materials. Too, as the foreign boom cools, and it shows the signs, there will be greater pressure from imports.

Loan Market Clue: Steel Stocks

Steel inventory cycles are a lead indicator to commercial bank loans to metalworking industries. This relationship has been uncovered by economist Lionel D. Edie.

Claims Mr. Edie as a result of his extensive analysis: Peaks in steel stocks precede peaks in metalworking loans. And troughs in steel stocks precede troughs in bank loans.

Here's what this means in current financial planning by metalworkers: Steel inventories are presently climbing out of a trough reached in late 1960. Bank loans will follow in a rising trend throughout the rest of the year.

GNP Up; Set To Go Higher

There is little question that auto sales sparked the present recovery. Gross National Product rose to $516 billion in the second quarter, up $15 billion from the first quarter. And auto sales accounted for nearly half of this rise.

This sales showing contributed to the most striking gain in any GNP element—inventories. Business stocks changed from a minus $4.0 billion in the first quarter to plus $2.8 billion in the second quarter.

The big thing now is that most signs point to a

broadening base to the recovery. Confident of this broadening strength, presidential economic adviser Walter Heller predicts a $570 billion GNP by the second quarter of 1962.

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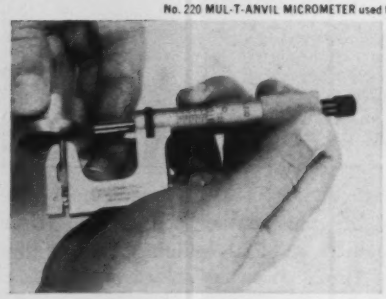

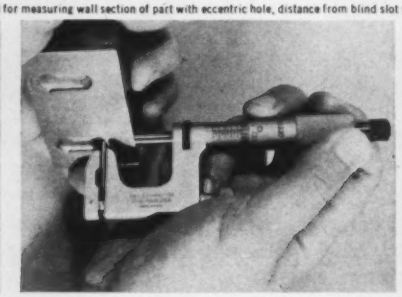

Anti-Trust: Senator Aims at Unions

The question of national emergency labor disputes will get "rather lengthy consideration" from Congress next year.

This is the prediction of Sen. Carl T. Curtis (R., Neb.), who wants to put labor unions under the anti-trust laws.

Sen. Curtis believes aiming trust-busting at the unions will "disperse the broad power the large internationals now have," without interfering with their legitimate functions.

By dispersing union power, Sen. Curtis says, "Collusion in boycotts would be removed." It would also put an end to compulsory unionism under which many workers now labor and have to pay tribute to a union regardless of their personal wishes.

Jobless Retraining Stalled Until 1962

The $262-million jobless retraining bill won't come up before Congress until the next session. House Rules Committee has postponed action, despite bipartisan support.

The two-year program would have provided for on-the-job training and vocational training for new skills of unemployed workers, especially those who were displaced by automation.

Labor Dept. Paints Picture of Jobless

Who are the jobless in the U.S.?

The Labor Dept. has released a composite picture based on workers receiving extended unemployment insurance benefits in mid-June.

The jobless worker is a male between the ages 25 and 55. He's either unskilled or semi-skilled. And he lives in one of six large industrial states—New York, Pennsylvania, Ohio, Michigan, Illinois, or California. He receives about $32 a week in jobless benefits.

Nearly 700,000 unemployed were receiving temporary extended unemployment benefits in mid-June. This represents more than one-third of the 2 million workers who had exhausted their rights to unemployment benefits under regular state programs since mid-1960.

MMSW: Sign Aid Pact With Teamsters Union

A mutual aid pact has been signed by the International Brotherhood of Teamsters and the Mine, Mill and Smelter Workers Union.

It's the first such joint agreement entered into by the Teamsters since the union's president, James Riddle Hoffa, made such pacts a goal at the Teamsters' convention in July. At the time, he said he would seek ties with other unions—both in and out of the AFL-CIO.

Main provisions: Each union will recognize jurisdictional lines of the other; they will aid each other in bargaining and organizing.

What may be a key feature for these particular unions: "Each party . . . shall coordinate their efforts in the fields of city, state, provincial and Federal legislation."

Both unions have had well-publicized run-ins with Congressional investigating bodies. The Teamsters for labor corruption. Mine-Mill for Communist domination. Both are outside of the AFL-CIO.

Teamsters: Roads Are Closed

Rebellion of Cleveland members of the International Brotherhood of Teamsters (IA — Sept. 7, '61, p. 9) has blossomed into a strike of 12 trucking companies which haul steel.

The ruckus had steel mill officials watching with something more than passing concern. About 80 pct of the steel purchased in Cleveland's two mills — Republic Steel Corp. and Jones and Laughlin Steel Corp. —is shipped by highway.

So far, enough trucks have been found from other carriers to keep the steel moving. However, if the strike spreads or even continues, mills could be in trouble.

Trucks were being stopped at mill gates by pickets and drivers' cards were being checked.

A group of driver-owners, headed by Arthur Pace, threatened to withdraw from the Teamsters Union about two weeks ago. Following this, Frank Glovan, president of Teamsters Local 407, struck nine Greater Cleveland trucking firms in Cleveland and Canton which refused to sign a new Central Area contract.

The National Steel Carriers Assn is also entering the fray. It is seeking an injunction against the union. Victor Schaeffner, attorney and managing director, maintains trucking companies would pay $1-million extra over three years under the contract signed in February by 11 companies.

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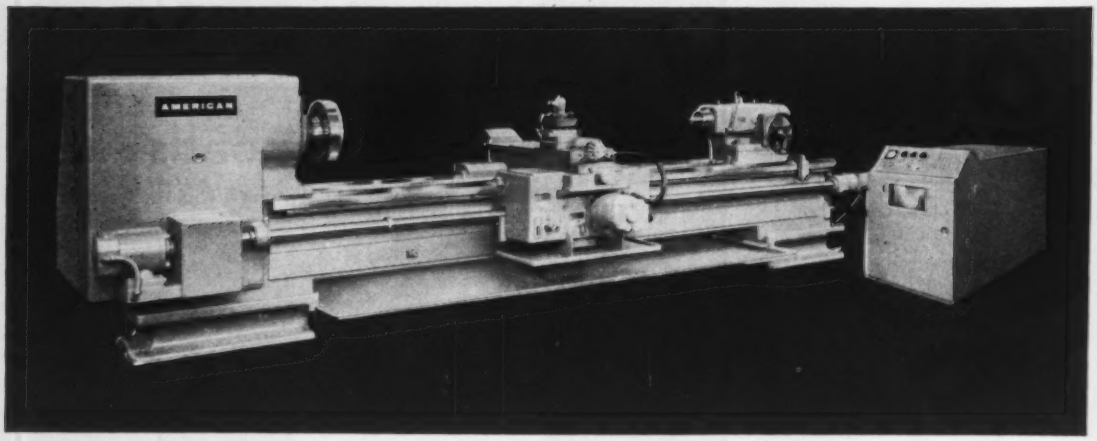

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★Tougher Antitrust Laws?

Sen. Estes Kefauver, supported by the U.S. Justice Dept., will push for passage of stiffer antitrust laws on corporations and their executives in the next session of Congress.

After getting backing from the Justice Dept., through testimony from Assistant Attorney General Lee Loevinger, Sen. Kefauver said he would hold more hearings on the matter after Congress adjourns.

Mr. Loevinger's testimony came at hearings before Sen. Kefauver's antitrust subcommittee. Mr. Loevinger, head of the Justice Dept.'s antitrust division, called present penalties for antitrust violations insignificant. Because of this, he said, it is hardly surprising that some business concerns consider antitrust prosecutions simply a normal business risk.

The antitrust chief backed this legislation: Sen. Kefauver's bill to hike the maximum fine on corporations from $50,000 to $500,000 for second offenders. A bill under which company presidents and members of the board of directors could be jailed if they had reason to know of antitrust violations but failed to stop them. A bill to require government contractors who submit identical bids to swear that the bids were not figured in collusion with competing companies. A bill sponsored by Sen. William Proxmire (D., Wis.) to empower Federal Courts to bar antitrust violators from their corporate offices under certain circumstances.

■ President Backs FTC Speedup Move

President Kennedy is supporting the Federal Trade Commission's bid to get authority to issue temporary cease-and-desist orders. FTC wants to issue the orders to businessmen while unfair trade practices cases are still pending.

Kennedy says the FTC is hampered by delays of cases. He adds that it has no power to halt illegal practices until conclusion of a case.

"As a consequence," the President says, "small businessmen who are so often the target of discriminatory and monopolistic activities are often irreparably injured or destroyed long before the lengthy process of adjudication has been completed."

Authority for the power rests with Congress, which is considering the FTC case.

Businessmen oppose the legislation, supporting their stand with this question: **"How can the FTC order a business to stop an 'unfair' trade practice before conclusion of the case which will judge the practice unfair or not?"**

■ Single Agency Set For Military Buying

Many defense contractors soon will be doing business with a single military buying agency. The Defense Supply Agency is being set up by the Pentagon.

It will purchase items common to all military services. It might ultimately become a central procurement agency for all defense buying.

The agency was set up by Defense Secretary McNamara. He wants to consolidate all top level defense operations.

Military men, fearing too much service unification, will balk at the project. But Congressmen, putting on the pressure for a long time to end defense waste, are applauding the move already.

Secretary McNamara believes the new buying agency will cut military inventories by $2 to $4 billion. Pentagon purchasing experts estimate annual savings under central procurement could total $50 million.

The agency will begin by taking over buying of food, clothing and textiles, traffic management, petroleum products and medical, general, industrial, automotive and construction supplies.

Later, purchase of industrial production equipment, chemical supplies, aeronautical spare parts and many electronic items may be placed under the agency's control.

The agency will begin actual operations in the next three months. But one to three years may be required for the complete changeover.

■ Scrap Rail Rates Ruled Just, Lawful

An Interstate Commerce Commission hearing examiner has declared that rail rates on scrap iron and steel in the eastern U. S. are neither unjust, unreasonable, nor otherwise unlawful.

The examiner, Albert E. Luttrell, recommended that the commission dismiss the complaint of the Institute of Scrap Iron & Steel and 360 of its 500 members in the East that the rail rates are unlawful. The Institute asked that a new scale of rates be adopted.

Mr. Luttrell reported that the basic position of the Institute is that various technological advances in steel making have reduced the volume of scrap consumed. Thus, because of low freight rates for iron ore and pig iron, scrap has been unable to compete effectively. Mr. Luttrell, however, could find no "undue preference" being given to pig iron and iron ore.

AUTOMATIC CAMSHAFT HARDENING

...one of many ways High Frequency Induction Heat-Treating can increase production and reduce costs!

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AM makes versatile heat-treating equipment for production runs or specialized jobs. Our experience in all types of heat-treating applications can produce cost and quality advantages in your specific work.

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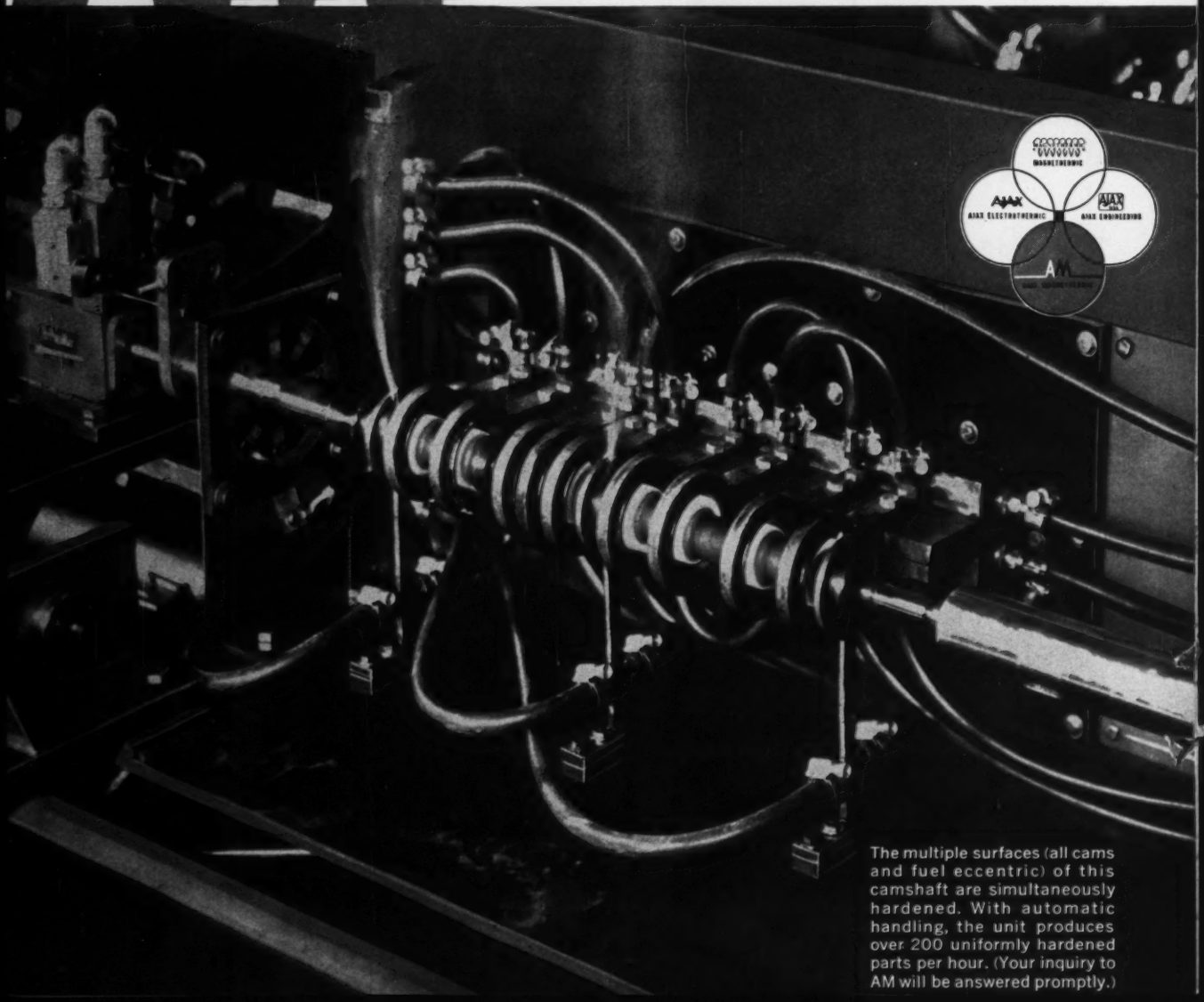


The multiple surfaces (all cams and fuel eccentric) of this camshaft are simultaneously hardened. With automatic handling, the unit produces over 200 uniformly hardened parts per hour. (Your inquiry to AM will be answered promptly.)

Congress to Probe U.S.-Red Trade

An investigation into whether American machines and supplies are

HODGES: A closer watch.

helping the cold war enemies of the U. S. will be held by Congress.

The House has created a five-man special committee to probe the quantity and quality of exports to Iron Curtain countries. This action was taken despite Commerce Secretary Luther Hodges' claim that his department is making "doubly sure" that nothing of strategic value is being sold to the Communists.

Rep. Paul Kitchin (D., N. C.), author of the bill, said ball bearings and machine tools are among the items being shipped to Russia and its satellites. Rep. Kitchin will probably head the new committee.

The decision of Congress to start the investigation follows several attacks on the practice by Mr. Kitchin, Rep. Thomas M. Pelly (R., Wash.), and other Congressmen.

Japanese to Dampen Economic Growth

The Japanese government apparently feels Japan will solve its balance of payments problem.

Biggest reason for the problem: Too rapid an economic expansion. Industrial production in Japan has doubled in the past three years. National income is up 50 pct over the same period. The government's original 10-year plan had called for an average annual national product growth rate of 7.2 pct. It allowed for perhaps a nine pct gain annually during the first three years.

So efforts are now underway to dampen the speed of expansion (IA —Aug. 17, '61, p. 13).

If and when these efforts are successful, it is expected that the balance of payments problem will be under much better control. And this may have some effect on plant and new equipment expansions.

It's a case of slowing things up so growth will not be quite so dynamic—dynamic enough to cause financial repercussions.

'Buy American': An Inferiority Sign?

The "Buy American" promotions should be considered "not as a slogan of national pride, but as an extremely unrealistic sales pitch."

This is the opinion of J. K. Fowlkes, president, Value Analysis, Inc. Mr. Fowlkes believes the "Buy American" plan is an admission of inferiority.

"There is not one good reason that anyone can give to prove that American manufactured goods cannot compete on an equitable basis with those produced abroad," says Mr. Fowlkes.

"This Buy American plan should be abandoned as an abject admission of incompetence and a banner of disgrace for the American free-enterprise system."

Mr. Fowlkes made his comments at a recent value analysis meeting.

Belgian Steel Output Continues to Rise

The Belgian economy is still gaining momentum. And there is a

good chance that 1961 will develop into a record year.

The steel industry, for example, is now working at full capacity with a backlog of orders ranging from 2.5 to 5 months. Crude steel production in the second quarter climbed six pct above the same quarter last year. Total output in the first half of the year was 3.33 million net tons.

That's below the 3.6 million tons produced in the first half of 1960. But Belgian steelmakers were hampered by an industry-wide strike early this year.

A large portion of Belgium's steel continues to go for export. According to the latest annual report of the Crouement des Hauts Fourneaux et Acieries Belges, 26 pct of the country's production was consumed at home. The rest was exported.

Another big boost to the Belgian steel industry was the recent announcement of the plans for an integrated steel plant at Selzaete along the Ghent-Schelde Canal. Output at this mill will eventually reach nearly three million tons annually.

NEW—TWO LOW-COST MINIATURE BALL BEARING LINES

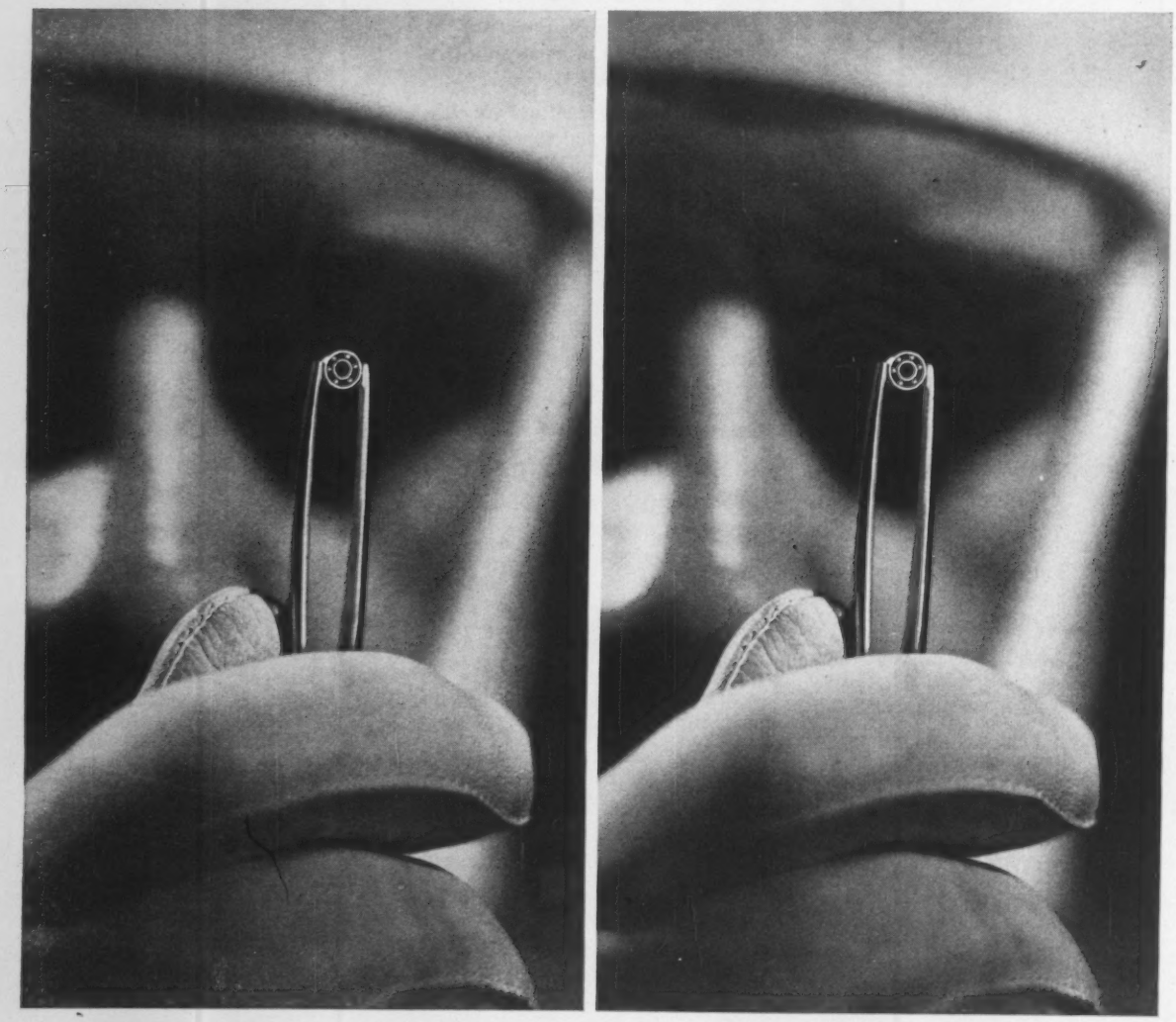
New Departure ABEC 3* and ABEC 5* miniature ball bearings now offer manufacturers of precision miniature potentiometers, gear trains, motors and similar precision products the opportunity to reduce bearing costs substantially.

New Departure ABEC 3 and ABEC 5 bearings can be used wherever the high precision and performance of ABEC 7 bearings are not required. They offer the engineer greater design versatility—he can select the most economical bearing for each application. Moreover, New Departure ABEC 3 miniature ball bearings can be used to upgrade products presently using precision sleeve bearings.

New Departure will continue to offer super precision ABEC 7 miniature ball bearings for your highly critical applications.

If you are planning a re-evaluation of your miniature bearing applications, it will pay you to consult the N/D Sales Engineer in your area. His assistance may help pave the way to reduced parts cost or enhance the quality of your product. For more information, write for booklet AST, NEW DEPARTURE, DIVISION OF GENERAL MOTORS CORPORATION, BRISTOL, CONN.

*Bearing tolerances as established by the Annular Bearing Engineers Committee of the Anti-Friction Bearing Manufacturers Assoc.



NEW DEPARTURE
MINIATURE AND INSTRUMENT BALL BEARINGS

Water Forms Metal Shapes

Water pressure is now being used as a sophisticated metalforming tool. Known as "decoction forming," this unusual method achieves remarkable results with simple, low-cost tooling. In early tests, a sheet-metal blank was fastened down around its outer edge. Then, water was fed in under the blank at pressures from 65-250 psi. Water swells each blank into a hemispheric bubble. Skin-thickness variations are under 0.004 in. Later work should result in 0.001-in. limits.

Alloy Resists High Heats

Metallurgists at Wyman-Gordon Co. report Inconel 718 responds well in closed-die forgings. Its behavior corresponds to that of alloys intended for use at up to 1300°F. Potential uses include aircraft and gas-turbine components, pumps for liquid-rocket engines and structural air-frame members. Test results indicate 100-hour stress-rupture life at 95,000-100,000 psi.

Average Properties	72°F	1200°F
Ultimate Strength, psi	178,000	174,000
0.2-pct Yield Strength, psi	148,000	133,000
Elongation, pct	28.0	19.0
Reduction of Area, pct	39.0	23.0

Balanced Workloads?

Two research projects now under way will affect future assembly-line operations. One study is aimed at making a model which will allow low-cost, in-line computers to balance assembly workloads. The other investigation deals with optimum production through the correct kind of product mix. Both projects are still in early stages.

Sound Gages Liquid Levels

U. S. Steel has found a new way to measure the liquid level in tanks containing a slurry of lime in water. The method hinges on an ultrasonic indicator. This device bounces a sound beam downward from the known height of the tank off the surface of the tank's contents. The indicator's continuous readout is independent of temperature, density, or any other property of the liquid involved. Readings are accurate within 1 in.—regardless of the liquid's level in the tank. The level of powdered solids can also be gaged with this new ultrasonic indicator.

Self-Sustaining Magnets

Recently developed is a simple chemical method for rapid, continuous growth of crystalline columbium-tin. This advance may lead to widespread use of superconductive magnets that need no power. Columbium-tin sustains strong magnetic fields without dissipating any power. Thus, once started by a small initial voltage, magnets made of this material will operate indefinitely.

Assembly-Line Steel

Steel mills are studying assembly-line methods for basic-metals production. Under this concept, steelmaking vessels move to different stations for charging, refining, pouring and upkeep. One benefit is full usage of oxygen jets and smoke-clearing units. Another is the elimination of metal loss during transfer operations. Refractory wear on transfer units is also curtailed.

Hears Flaws in Motors

For the "doctor of automotive difficulties," a mechanical stethoscope pinpoints the source of motor ailments. True to its name, this instrument operates on the same principle as your family doctor's stethoscope. By using it to listen to an engine, a mechanic can tell which hydraulic lifter is bad, which cylinder has the piston slap, or which bearing is causing noise.

Coats Plastic or Glass

Experimental work has led to a coating method that produces both controlled light transmission and conductivity on a single substrate surface. Before, only relatively-soft or low-melting substances could be used. Now, this new high-vacuum process deposits metals such as platinum, tantalum, columbium or Nichrome. Fractional-distillation effects are held to a minimum.

TEST YOUR ELASTIC STOP® nut KNOW-HOW WITH THIS 60-SECOND QUIZ

1. To provide controlled interference (locking torque) with bolt threads, the nylon locking insert of an Elastic Stop nut has an I. D. that is
   a. ☐ *undersized* *b.* ☐ *same size*
   in relation to major diameter of standard bolts.

2. As bolt threads enter the nylon locking collar they
   a. ☐ *cut* *b.* ☐ *impress*
   perfect mating threads and bring bolt and nut thread surfaces into firm metal-to-metal contact.

3. An Elastic Stop nut
   a. ☐ *increases* *b.* *diminishes* *c.* ☐ *eliminates*
   wear producing axial play between bolt and nut.

4. Upon removal from the bolt, the nylon collar of an Elastic Stop nut
   a. ☐ *retains its thread impressions.* *b.* ☐ *tends to resume its original shape.*

5. A nylon insert Elastic Stop nut can be re-used without losing its locking torque
   a. ☐ *10 times* *b.* ☐ *25 times* *c.* ☐ *over 50 times*

6. An Elastic Stop nut will
   a. ☐ *always* *b.* ☐ *sometimes* *c.* ☐ *never*
   seize, gall or remove plating from bolt threads.

7. An Elastic Stop nut can be
   a. ☐ *more accurately* *b.* ☐ *less accurately*
   prestressed than an all-metal nut.

8. Regardless of vibration, impact or stress reversal an Elastic Stop nut will stay put
   a. ☐ *anywhere on the bolt.* *b.* ☐ *only when torqued against the work.*

9. Fuels, lubricants, moisture
   a. ☐ *can* *b.* ☐ *cannot*
   seep past the chemically inert locking collar to cause corrosion of internal bolt-nut threads.

10. The single-unit Elastic Stop nut costs approximately
    a. ☐ *more* *b.* ☐ *the same* *c.* ☐ *less*
    to install than a castellated nut and cotter pin, or a double nut.

Check Your Score

1 *a.* 2 *b.* 3 *c.* 4 *b.* 5 *c.* 6 *c.* 7 *a.* 8 *a.* 9 *b.* 10 *c.*

Write Dept. S62-977 for Elastic Stop nut Bulletin describing hundreds of Elastic Stop nut hex shapes and sizes—from 0-80 to 4"—in carbon and stainless steels, brass, aluminum and other alloys, in all standard finishes.

ELASTIC STOP NUT CORPORATION OF AMERICA
2330 Vauxhall Road, Union, New Jersey
for the ring of reliability

In May, 1961:

two major achievements
in Sendzimir
coating lines:

The world's largest

AT ARMCO STEEL CORPORATION

The world's fastest

AT YOUNGSTOWN SHEET AND TUBE COMPANY

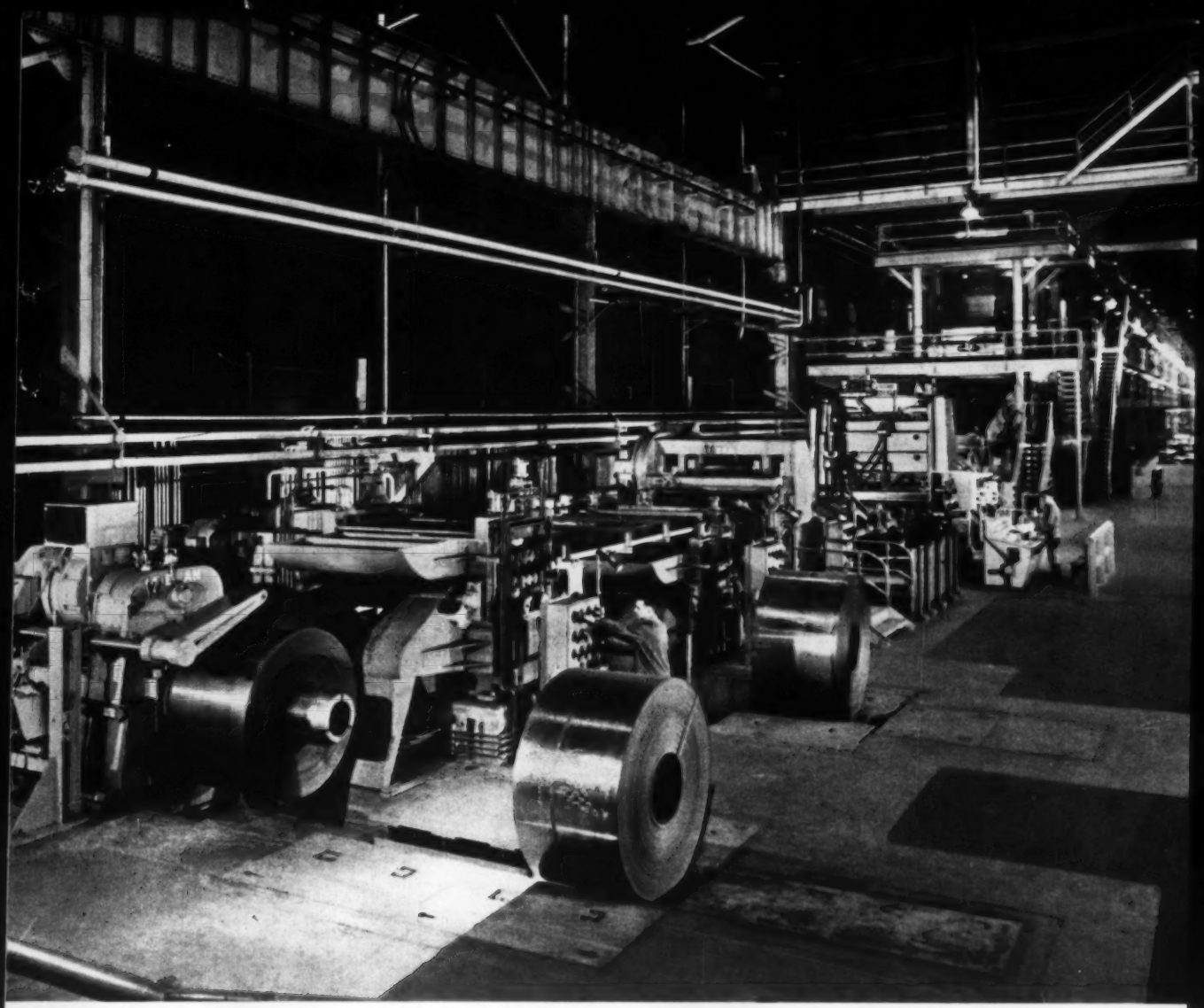
Both lines
built by
WEAN

72″

Armco Steel Corporation

The widest coating line in the world at Armco's Middletown Works turns out zinc-coated steel coils and sheets up to 72″ in width. In addition to permitting Armco Division to meet growing demand for zinc-coated steels, this new **Wean-built** line will open many new design possibilities to Armco's fabricating customers by giving them greater dimensional latitude than ever before available.

Designed to handle strip from 11 through 22 gauge, the line employs the Armco-Sendzimir process of annealing and coating in one continuous operation.



400 fpm

Youngstown Sheet and Tube Company

The world's fastest Sendzimir coating line was installed by Youngstown Sheet and Tube Company at its Indiana Harbor works. Constructed by **Wean Engineering,** this line is designed to operate at speeds up to 400 feet per minute, and to handle strip widths up to 62″, and gauges ranging from 10 through 30.

Youngstown's new 848-foot line incorporates every modern facility, insuring superior quality zinc-coated sheets in both cut-lengths and coils; flat or corrugated.

Planning new strip processing facilities? Talk to Wean . . .

During this period of growing competition among producers of finished steel products, Wean has led the industry in the development of more efficient continuous processing facilities, designed to turn in additional profits for steel producers.

Wean processing equipment is precision-engineered and built to meet your exact requirements, the result of close coordination between our specialists and your engineering department, use of modern techniques by our experienced design staff, and the facilities of our specialized manufacturing operation.

Why not put this background of "creative engineering" know-how to work at improving profits in your continuous processing operation?

THE WEAN ENGINEERING COMPANY, INC. • WARREN, OHIO, U. S. A.

More Information

Sir—Would you please send me further information in regard to your article on "Pushbutton Annealing" as described in the Techfront page of your Aug. 24 issue? This is not entirely new, but apparently it is gaining some recognition and your further comments will be appreciated.—N. Kowall, Pratt & Letchworth Div., Dayton Malleable Iron Co., Inc., Buffalo, N. Y.

▪ **For additional information, contact Mr. Lyle Witte, Link Belt Co., Prudential Plaza, Chicago.—Ed.**

Pinpointed Flaws

Sir—In the Aug. 24 issue of The IRON AGE you refer to a machine that pinpoints flaws in wire (Techfronts, p. 15). We would appreciate any information you can give us as to the manufacture of this equipment.—L. C. Crewe, Jr., president, Maryland Fine & Specialty Wire Co., Inc., Cockeysville, Md.

▪ **Contact Mr. Kent S. Putnam, Associated Spring Corp., 100 Wallace St., Bristol, Conn. for this information.—Ed.**

Good Job

Sir — Congratulations on a consistently good job of reporting. Some of the recent editorials in The IRON AGE show the way very clearly.

Your suggestion that we use economics and trade weapons is basic. However, how many people realize the number of licenses the State Dept. issues daily to companies that want to do business with Russia? Do these companies realize that the Communists take these products, copy them—or substitute theirs for ours—and then depress world markets by dumping at below-cost prices?

Unfortunately, most people do not know the naked truth. You are getting good readership and you deserve it. If you would get the facts on this situation and publish them, you would embarrass unwise management into doing without a few dollars profit today for a continued profit ten years from now. Doing business with any Communist country is economic suicide in the long pull.

A new government policy is not needed. Businessmen can set a policy of economic boycott now that will produce the desired results.—C. A. Anderson, Haskins Steel Co., Inc., Spokane, Wash.

Spotwelding

Sir—We were very much interested in the material contained in the article "How Easily Can You Join Metals By Resistance Spotwelding?" that appeared in the Aug. 10 edition of The IRON AGE. Could we have a reprint?—L. K. Bjelland, Convair Div., General Dynamics Corp., Pomona, Calif.

Sir—I read with interest your Aug. 10 issue and the article regarding resistance spotwelding. Is a reprint available?—Michael Kolosowski, Chicago.

▪ **Reprints are on the way.—Ed.**

"Nothing today? Well, lemme show you a couple card tricks so our day isn't wasted, hmm . . . ?"

YOU CAN "PUT THE BITE" ON Southern

Southern fasteners would pass the old-time "bite" test for quality without a doubt. They'll stand any test for quality because they are made by USA specialists using USA materials.

You can "put the bite" on Southern for service, too. Contact your Southern distributor today, or write, wire or phone Southern Screw Company, P.O. Box 1360, Statesville, North Carolina. Phone TRiangle 3-7213.

Manufacturing and Main Stock in Statesville, North Carolina. Warehouses: New York • Chicago • Dallas • Los Angeles

Machine Screws & Nuts • Tapping Screws • Stove Bolts • Drive Screws • Carriage Bolts • Continuous Threaded Studs • Wood Screws • Hanger Bolts • Dowel Screws

Western BRASS

(Before)

Olin BRASS

(After)

The letterheads have been printed, signs made... and here we are wearing a new name. But in the mills things go on pretty much as they always have. We've put in some new machines and broadened our line... but essentially it's the people at Western (oops!) *Olin* Brass that really make the product. They *care*. That's the "Tailor-Made" approach.

If you're an old customer you know what we mean. If you're not – ask one of our users. Chances are he'll tell you the uniform quality and individual engineering of his metal has managed to save him money in inspection, fewer rejects and less lost time.

Olin Brass can do the same thing for you.

We're the same folks.

(Brass sales headquarters at East Alton, Illinois)

METALS DIVISION Olin
400 Park Ave., New York 22, New York.

Doubleheader

This week we let go with both barrels at one of the most dramatic developments of the decade—the revolution in steel technology and steel marketing.

The timing is right, too—just before the annual convention of the Association of Iron & Steel Engineers in Pittsburgh, September 25-28.

Full-Color Report — Triggering one barrel is our metallurgical editor, C. L. Kobrin. Setting his sights on the technological explosion in the steel industry, Cal interviewed top steelmaking experts for his dynamic, full-color report beginning on p. 181. His well-researched report analyzes for readers the scope of changes now taking place and their impact on the industry's future.

Hand-in-hand with the technological explosion has come a revolution in the marketing of the steel industry's products.

Steel Market Outlook — Pittsburgh editor G. J. McManus takes aim on the industry's new marketing look with his own analysis based on extensive interviews with steel executives. (See p. 139.)

Never have so many new steels and steel mill products been brought to the market in such a short time.

Plus an Editorial — And while we're shooting off these guns, we'd like to call your attention to the barrage laid down by Editor-in-Chief Tom Campbell in his editorial on p. 5.

In his forceful, penetrating manner, Tom hits the bullseye with his analysis of the steel industry's problems, achievements and new directions.

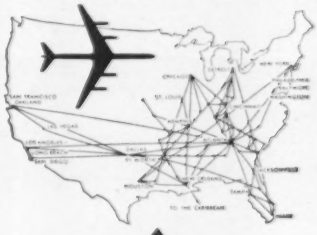
These are the topics which will be uppermost in the minds of steel operating men gathering at their annual convention in Pittsburgh. For the papers to be presented at the meeting see p. 188.

INTERVIEW IN DEPTH: For his story on the revolutionary changes taking place in steelmaking, Metallurgical Editor C. L. Kobrin interviewed many experts. His report, with full-color photographs, begins on p. 181.

WHAT DO THESE ITEMS HAVE IN COMMON?

All are rushed to destinations by Delta Air Freight; get nationwide overnight right-to-the-door delivery. Thousands of commodities speed daily with Delta dependability. For *your* next shipment, check how little by Delta — always faster, often cheaper.

EXAMPLES, DOOR-TO-DOOR:
100 lbs. Los Angeles to Canaveral $29.85
200 lbs. New Orleans to New York $29.50



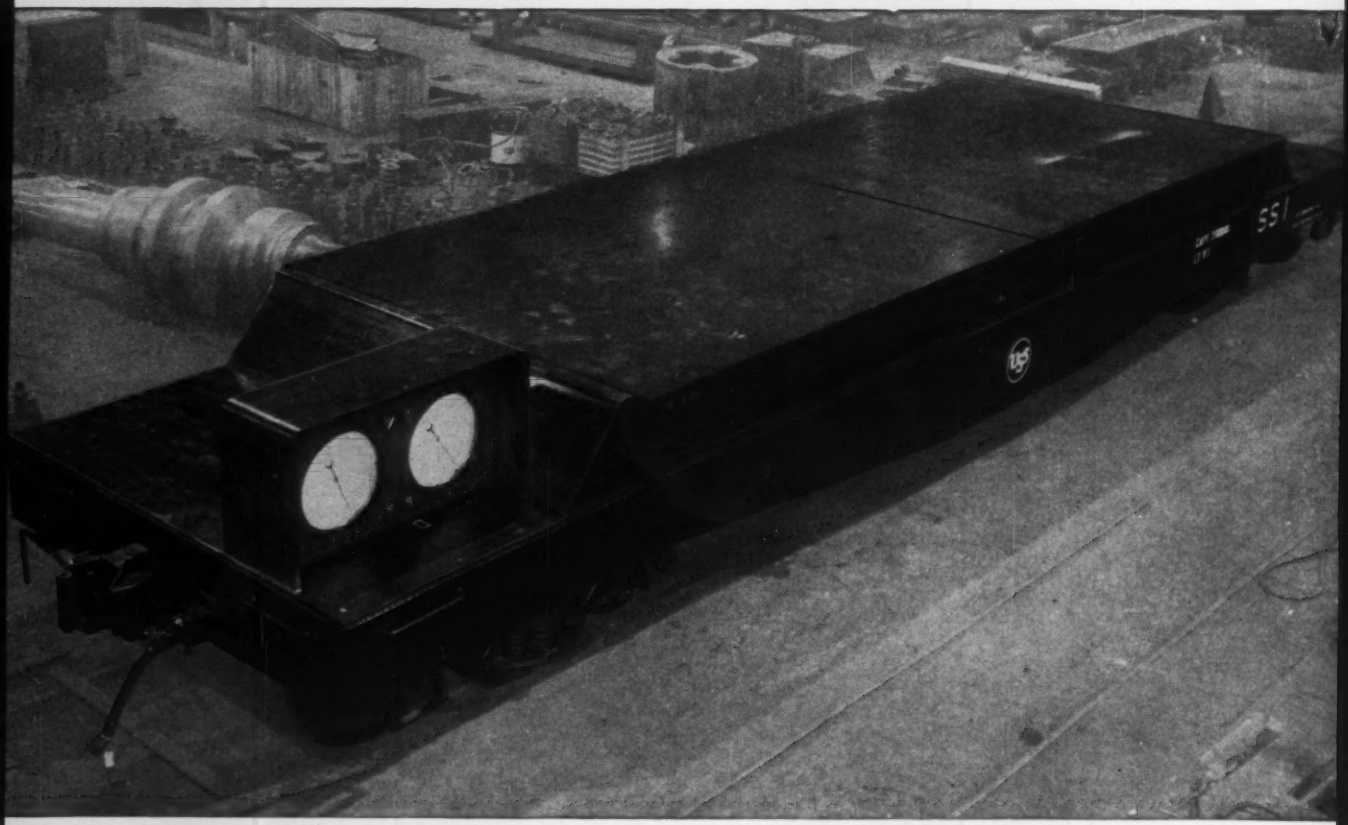
DELTA

the air line with the BIG JETS

GENERAL OFFICES: ATLANTA, GEORGIA.

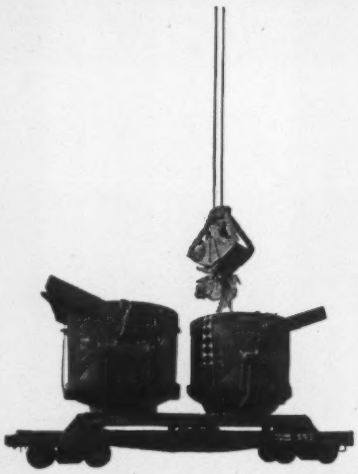
We think this all-purpose weigh car is too good to keep to ourselves

This mark tells you a product is made of modern, dependable Steel.



Weigh anything up to 100 tons, anywhere on the track, with this new, all-purpose weigh car. It's accurate to within two-tenths of one percent of anything up to 100 tons or two separate 50-ton loads. Because the hydraulic load cells need no power, you can weigh anywhere. A weigh car can pay for itself by eliminating guesswork and human error.

At McLouth Steel Corporation in Detroit, Michigan, they cut handling time by weighing stainless steel scrap and other expensive alloying ingredients right in their stock yard. Accurate weight records give them better control of inventory and charging mixtures and make it easier to find the yield cost. Other steel producers cut costs by weighing to control electric furnace yields. We build this all-welded, stress-relieved steel car to stand up under all of these uses and give long, dependable service.



Loading scrap at McLouth Steel does double duty because the weighing is done at the same time. This cuts handling time in the mill and gives better control of the charging mixtures.

USS Weigh Cars and other industrial cars are built to last by United States Steel, a company that also uses them! We can custom design and build any type weigh car to suit your needs. Send your weight problems to United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

United States Steel Corporation, Pittsburgh
Columbia-Geneva Steel, San Francisco
Tennessee Coal & Iron, Fairfield, Alabama
United States Steel Export Company

United States Steel

USS

TRADEMARK

COMING EXHIBITS

Industrial Building Exposition—Sept. 25-28, New York Coliseum.

Fleet Maintenance Exposition—Oct. 23-26, New York Coliseum.

Metal Show — Oct. 23-27, Cobo Hall, Detroit. American Society for Metals.

Marine Supplies & Equipment Show—Nov. 15-17, Hotel Roosevelt, New York City.

MEETINGS

SEPTEMBER

Non-Ferrous Founders Society—Annual meeting, Sept. 17-21, Shawnee Inn, Shawnee-on-the-Delaware, Pa. Society headquarters, University Bldg., 1604 Chicago Ave., Evanston, Ill.

Standards Engineers Society—Tenth annual meeting, Sept. 18-20, Hotel Sherman, Chicago.

Electric Overhead Crane Institute—Meeting, Sept. 19, Palmer House, Chicago.

Producers' Council 40 Convention—Annual business meeting and elections, Sept. 20-21, Pittsburgh Hilton Hotel.

AEC Welding Forum — Annual meeting (classified), Sept. 20-22, Southwest Research Institute. Institute headquarters, Granada Hotel, San Antonio, Texas.

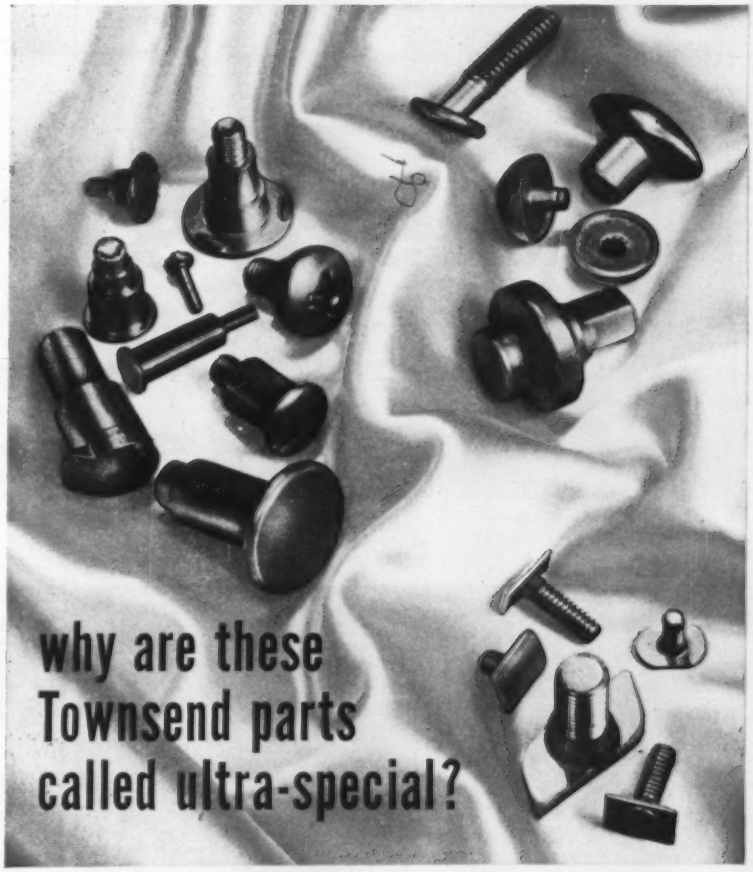
Industrial Electronics Symposium—Sept. 21-22, Bradford Hotel, Boston. Institute headquarters, 51 East 42nd Street, New York 17.

American Institute of Mining & Metallurgical Engineers—Fall meeting, Sept. 21-23, Sheraton-Cleveland Hotel.

Metal Cutting Knife Assn.—Fall meeting, Sept. 22, Pittsburgh Hilton Hotel, Pitts., Pa.

Pressed Metal Institute — Annual meeting, Sept. 24-28, The Grand

(Continued on P. 28)



We call the metal parts shown here Ultra-Special because they are the result of completely new cold-forming and finishing techniques. They are typical examples of how users are reducing costs by taking advantage of the strength, improved quality, close dimensions and economy of mass-producing parts by cold-forming.

In the past, the limitations of the cold-forming process forced manufacturers to accept parts which were made by other, more costly methods. Now, through extensive research and development work Townsend is cold-forming Ultra-Special items with intricate shapes and critical dimensions held to tolerances as close as .001 inch. They may be made by combining cold-heading processes with impact extrusions, special heat-treatment and coatings, to name but one of the new techniques.

The use of Townsend Ultra-Special items in your product assembly could provide the means to make better products at lower costs. Investigate by asking a Townsend field engineer to call. Write Townsend Company, Engineered Fasteners Division, P. O. Box 71-B, Ellwood City, Pa.

Townsend Company

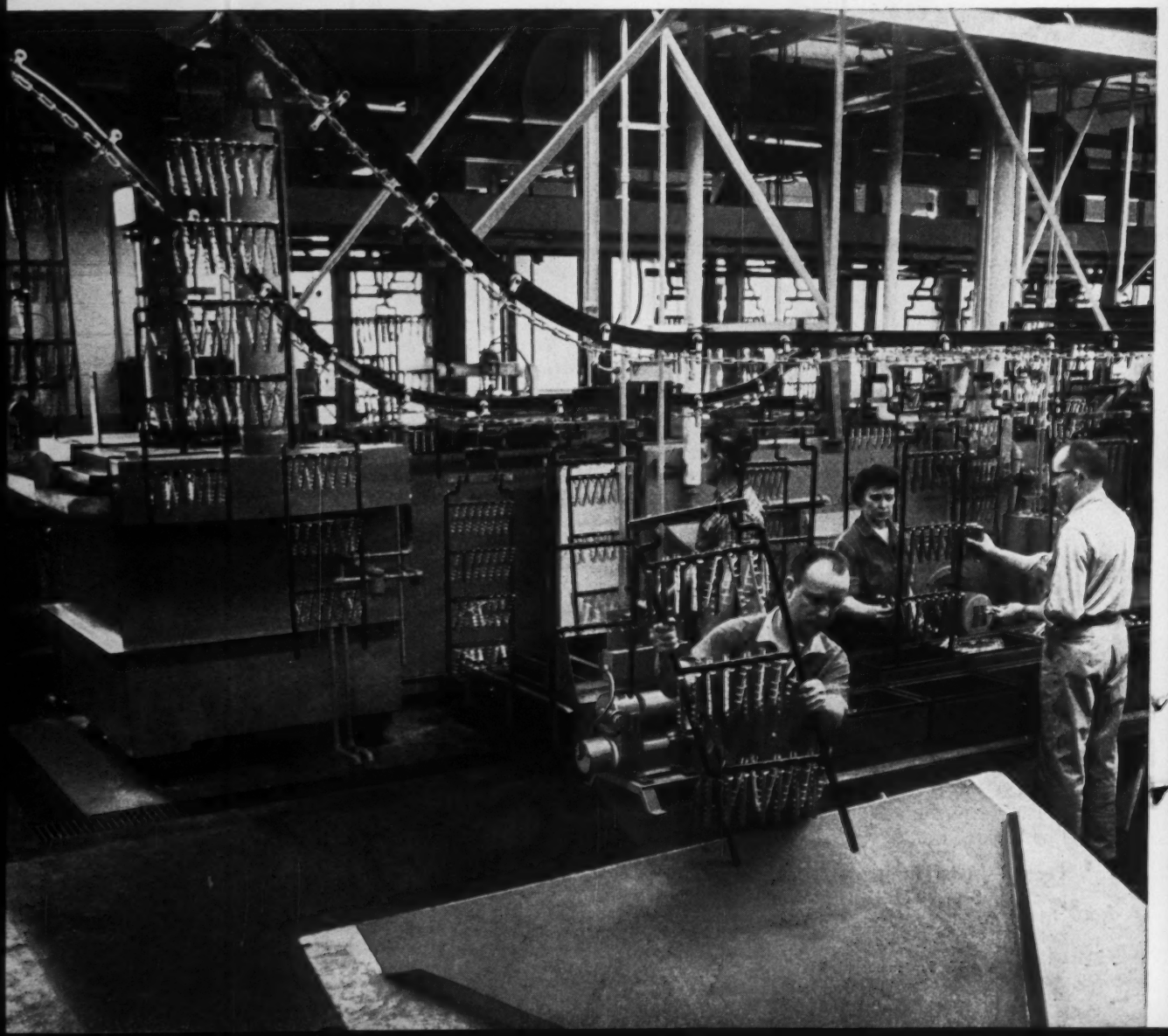
ESTABLISHED 1816

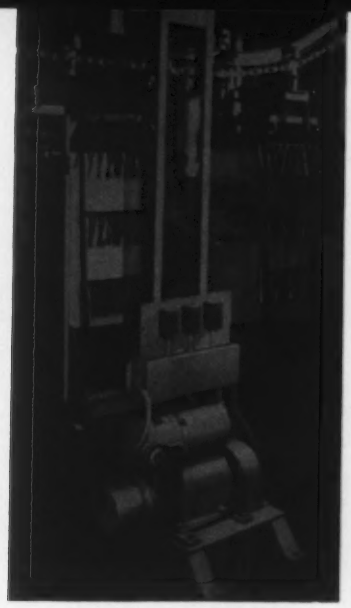
Engineered Fasteners Division

ELLWOOD CITY • PENNSYLVANIA

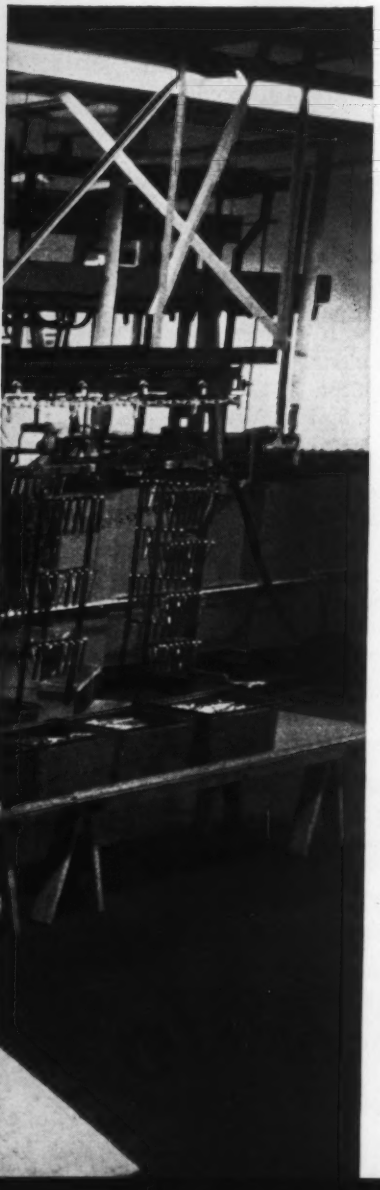
In Canada: Parmenter-Bulloch Manufacturing Co., Limited, Gananoque, Ontario

here's plating automation





at its best!



Udylite Cyclemaster ties into plant conveyor system, features automatic rack loading and unloading mechanism

A fully-automatic Udylite Cyclemaster was selected by Koelling Metal Parts, St. Louis, Missouri, to meet high-production, high-quality plating requirements on looseleaf binder and catalog components. This 15-station machine with automatic load and unload mechanism, shown above, is tied directly into a "stop and go" overhead plant conveyor system for maximum material flow efficiency. ■ This Udylite Cyclemaster provides peak production flexibility for Koelling. It operates at any rate from 40 to 120 racks per hour with plating thickness easily varied from .0001" to .001". Parts of any size can be plated within the limits of the 16" x 8" x 36" racks. ■ The Cyclemaster maintains exacting quality control standards, boosts plating volume and offers an important reduction in floor space requirements. To find out how you can obtain the ultimate in automatic plating today at a surprisingly low cost, call your Udylite Representative and have him tell you the complete Cyclemaster story. Then, let Udylite Engineers recommend the specific machine and conveyor system to best meet your requirements.

Udylite

THE UDYLITE CORPORATION
DETROIT 11, MICHIGAN

NOW

Portland, Oregon Bulk Unloader Ready to Slash Import Costs

Portland Public Docks proudly announces completion of its giant new straight-line bulk unloader and pier—the only plant of its kind on the Pacific Coast! With a rated-capacity of 900 tons-an-hour, this facility cuts the heart out of dry bulk importing costs and puts the savings in your pocket.

- direct transfer from ship to rail or truck
- 140-car rail yard
- open storage area
- cargo shed
- will handle all types of vessels . . . all types of dry bulk cargoes

Specially designed to create savings for importers of ores, ore concentrates, chemicals, salts, feeds and all dry bulk cargoes.

FOR COMPLETE INFORMATION CONTACT:
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MEETINGS

(Continued from P. 25)

Hotel, Point Clear, Ala. Institute headquarters, 3673 Lee Rd., Cleveland.

American Welding Society — Fall meeting, Sept. 25-28, Adolphus Hotel, Dallas, Texas. Society headquarters, 33 W. 29th St., New York.

Assn. of Iron and Steel Engineers —Annual convention, Sept. 25-28, Penn - Sheraton Hotel, Pittsburgh. Assn. headquarters, 1010 Empire Bldg., Pittsburgh.

Steel Founders' Society of America —Annual meeting, Sept. 25-26, The Homestead, Hot Springs, Va.

American Hot Dip Galvanizers Assn.—Semi-annual meeting, Sept. 25-27, Sheraton-Jefferson Hotel, St. Louis, Mo. Assn. headquarters, 5525 Manning Place, N.W., Washington 16, D. C.

American Welding Society — National fall meeting, Sept. 25-28, Hotel Adolphus, Dallas, Texas.

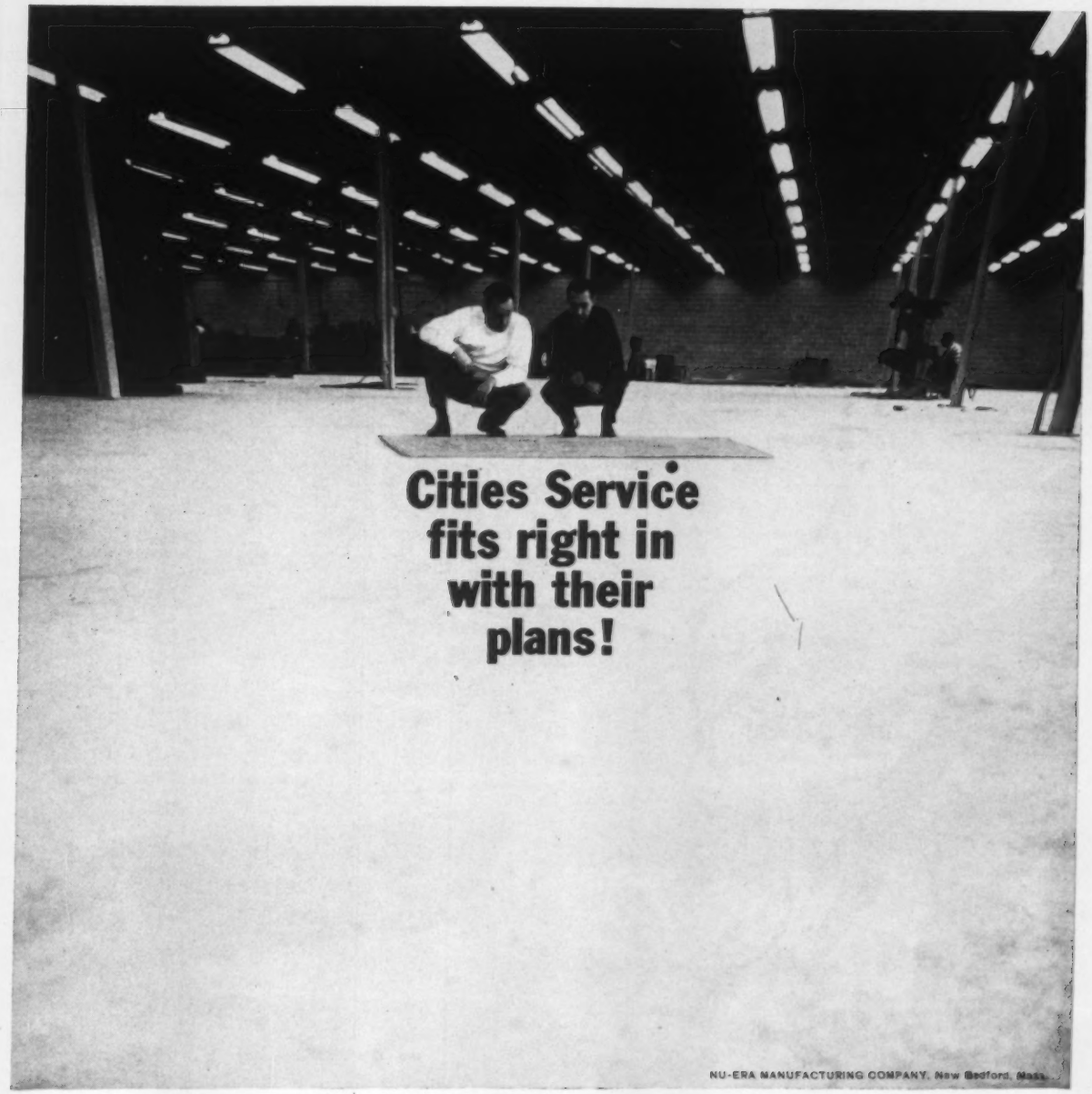
Metal Cutting Knife Assn.—Fall meeting, Sept. 27-28, The Homestead, Hot Springs, Va.

American Society of Tool and Manufacturing Engineers — Meeting, Sept. 27-28, Statler Hilton Hotel, Detroit.

American Die Casting Institute Inc. and The Die Casting Research Foundation—Annual meeting, Sept. 27-28, Edgewater Beach Hotel, Chicago. Institute headquarters, 366 Madison Ave., New York.

American Production and Inventory Control Society — Annual national conference and technical exhibit, Sept. 28-29, Pick-Congress Hotel, Chicago. Society headquarters, 330 S. Wells St., Chicago 6.

Purchasing Agents Assn. — 14th Pacific Inter-Mountain Conference, Sept. 29-30, Westward Ho Hotel, Phoenix, Arizona.



Cities Service fits right in with their plans!

NU-ERA MANUFACTURING COMPANY, New Bedford, Mass.

There's a bright future ahead for Nu-Era, manufacturer of replacement gears. The firm recently built this huge plant to handle increased orders... and Cities Service definitely fits in with their plans. Says General Manager Bill Rebone, "At first, all cutting oil brands seemed to be the same. However, we soon realized that Cities Service oils were giving us superior performance in every respect. Most of our gears are made of #5135 steel, a real tough customer to work with. Yet, we find we're getting long tool life, extra clean cuts with Cities Service Chillo 30 Cutting Oil." Nu-Era now relies, exclusively, on Cities Service for their metal machining fluids. Find out how Cities Service can fit in with your plans. Simply contact your nearest Cities Service office or write: Cities Service Oil Company, 60 Wall Street, N.Y. 5, N.Y.

CITIES SERVICE

Out Front in Quality... Out Front in Service, too!

A NEW HIGH NOTE IN HEEL FASHIONS

WITH COLD FINISHED STEEL BARS

Only steel could do the job. The designs for women's new super-slim, high-fashion heels required greater strength. Small diameters must withstand terrific pressure. The material must give, not break.

As have thousands of other manufacturers confronted with new product designs, heelmakers found the answer in a Bliss & Laughlin cold finished steel bar.

Bliss & Laughlin cold finished steel bars are used in countless products. They impart high strength with safety, from high-fashion heels to automobiles. They make small boys happy with sturdy bicycles and model engines. They help transmit power to huge earth-moving equipment and giant ocean liners.

Check out your designs with Bliss & Laughlin. As specialists in strength, finish, accuracy, straightness and machinability for 70 years, Bliss & Laughlin has recommended time and again the most suitable and economical bar from the industry's most complete line of cold finished steels.

Seven Bliss & Laughlin mills across the nation, collaborating with Steel Service Centers everywhere, assure highly personalized, local service!

The smallest cross section in this heel is only .14". Strength is provided by a C-1144 cold finished steel bar, heat treated to a Rockwell hardness of 35-38 after machining.

Leading Independent Producer of Cold Finished Steel Bars

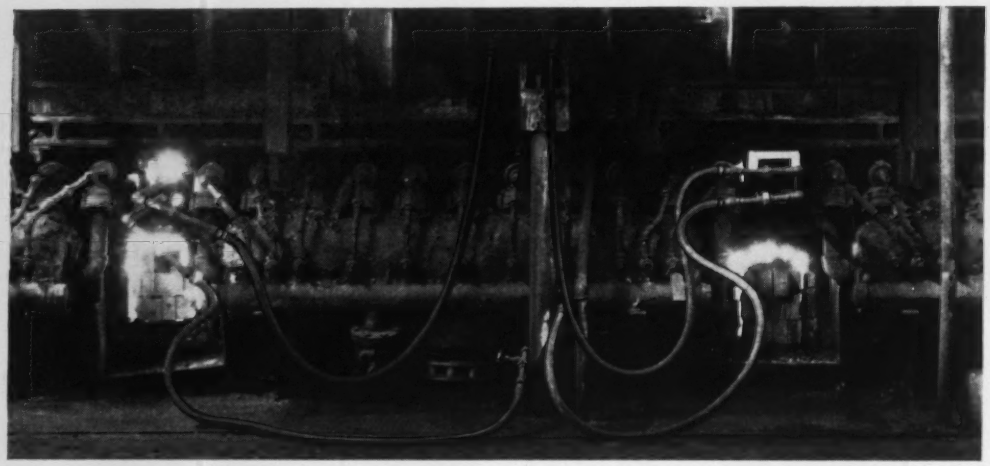
BLISS & LAUGHLIN

BL-617

GENERAL OFFICES: Harvey, Ill. MILLS: Harvey, Ill., Detroit, Cleveland, Buffalo, Mansfield, Mass., Los Angeles, Seattle

US RUBBER

AT THE HEART OF INDUSTRY...



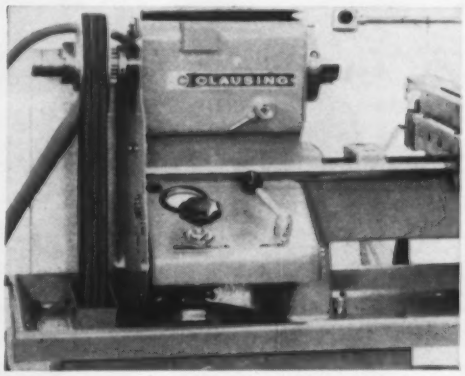
Kaiser Steel depends on U. S. Peerless® Water Hose to prevent costly pipe skid burn at its Fontana, California, mill. This premium-quality general-purpose water hose, here carrying both cooling and heated return water, has demonstrated its superior resistance to age, abrasion, heat, and pressure in applications throughout the entire metal working industry.

H 123

In the production of steel products, from furnace to fabrication, US Industrial Rubber Products have long been known for the efficiency and reduction in costs they make possible. As the world's largest producer of Industrial Rubber Products, US keeps constantly abreast of industry's needs.

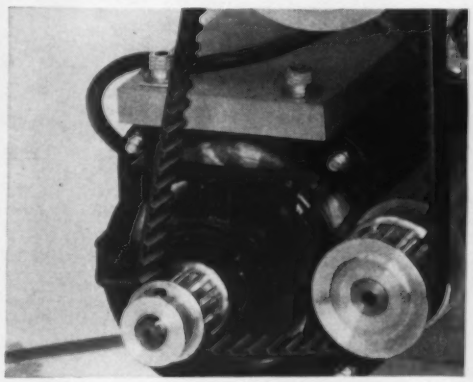
In the tough jobs like this one, U. S. Rainbow® Sandblast Hose demonstrates its exceptional qualities. Carrying sand or steel shot after other hoses have failed, this hose provides safety as well as long wear. Its durable rubber tube is especially treated with a highly conductive material to dissipate static electricity, and its strong carcass flexes easily to prevent kinking.

H 122



The abuse of continual starting and stopping was no problem for the U.S. Royal V-Belts used on this Clausing semi-automatic boring and turning lathe. These belts were selected because they ran cool, took little space, were exceptionally high in power-transmission efficiency. They proved to be the most uniform and smoothest running of many belts tested.

VB 105



One of the first users of U.S. PowerGrip "Timing"® Belts, Litton Industries now uses thousands of them to drive separate tape-drive assemblies on sensitive punched-tape recorders. These belts insure quietness, accuracy, and simplicity . . . all at low cost . . . and allow operators to change shaft rotation speeds by simply changing the belt sprocket.

TB 104

For every industrial rubber product need, turn to US. For Conveyor Belts, V-Belts, the original PowerGrip "Timing"® Belt, Flexible Couplings, Mountings, Fenders, Hose and Packings . . . custom-designed rubber products of every description. Discover why U.S. Rubber has become the largest developer and producer of industrial rubber products in the world. See your U.S. Rubber Distributor or contact US directly at Rockefeller Center, New York 20, N. Y.

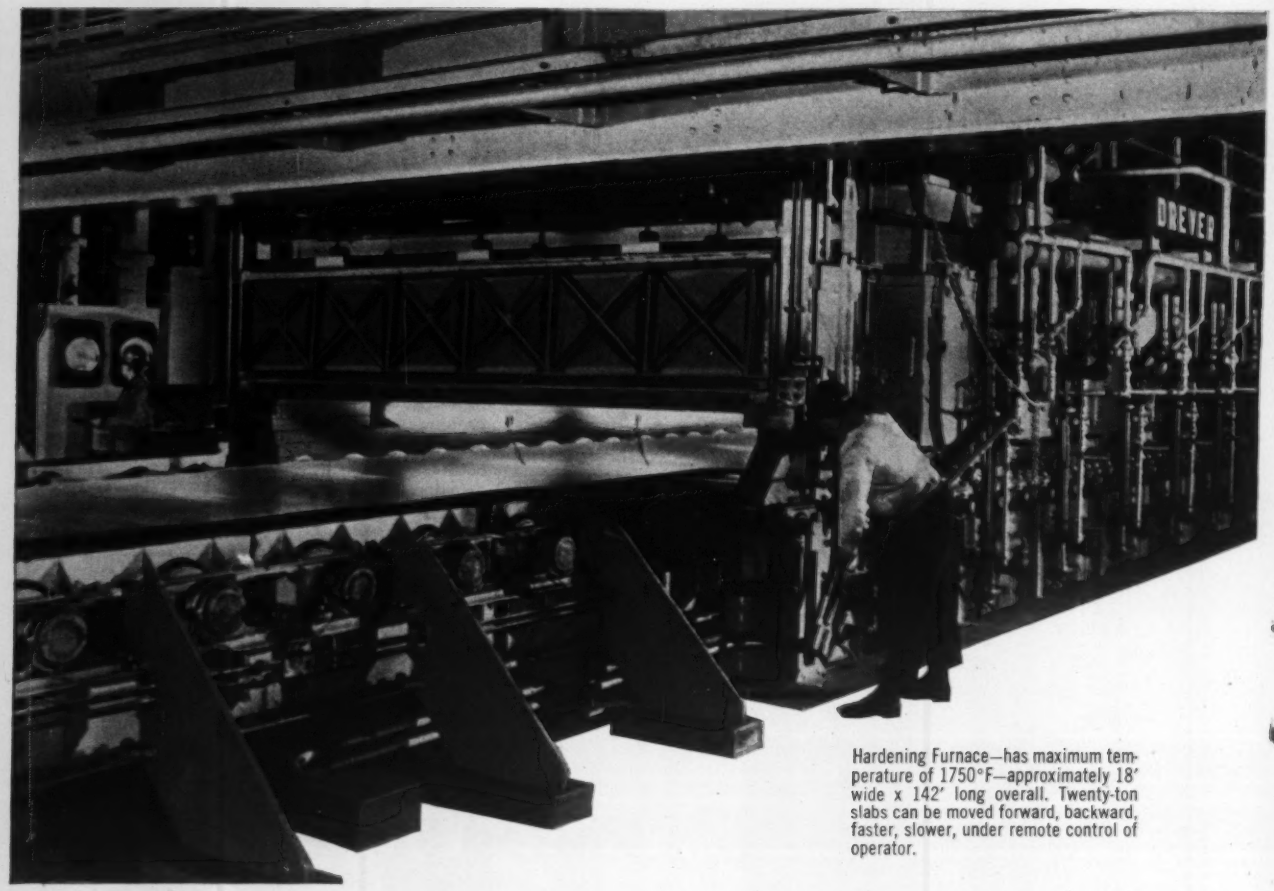
WORLD'S LARGEST MANUFACTURER
OF INDUSTRIAL RUBBER PRODUCTS

United States Rubber
MECHANICAL GOODS DIVISION

NOW 4 DREVER CONTINUOUS WIDE PLATE HEAT TREATING LINES OPERATING AT U.S. STEEL'S HOMESTEAD WORKS

WITH FOUR Drever Continuous Heat Treating Lines in operation, the Homestead District Works of United States Steel Corporation has the most complete and flexible continuous heat treating plant for plate in the steel industry. The Drever Lines serve their 160″ and 100″ plate mills. Carbon, alloy and stainless plates ranging from 1/10 inch to 2 inches thick over the full hearth width, and up to 45′ long are handled in automated, prescribed operations that assure accurate, uniform treatment. Each line is operated by a single man through closed circuit television monitoring and under "pushbutton" control. The only handling required is at the charge and discharge points.

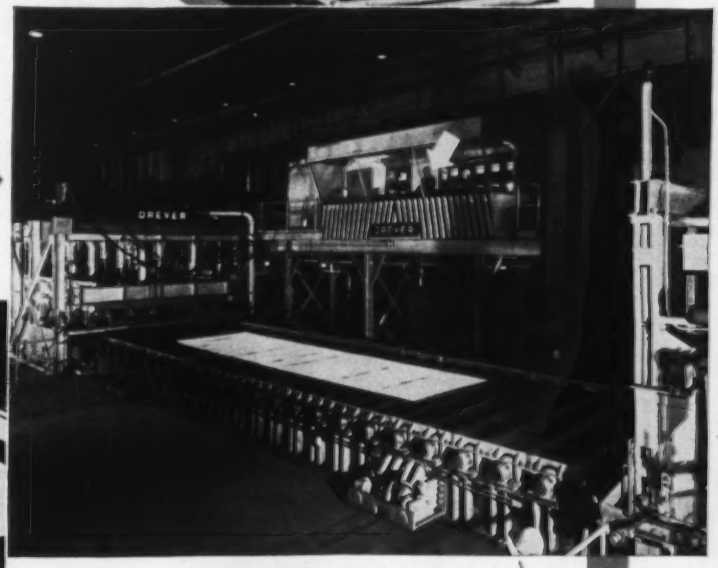
The versatility of the Drever equipment in processing wide plate for normalizing, for hardening and tempering, for annealing provides the Homestead Works with facilities for high, economical production to meet the ever growing demand for heat treated steel plate.

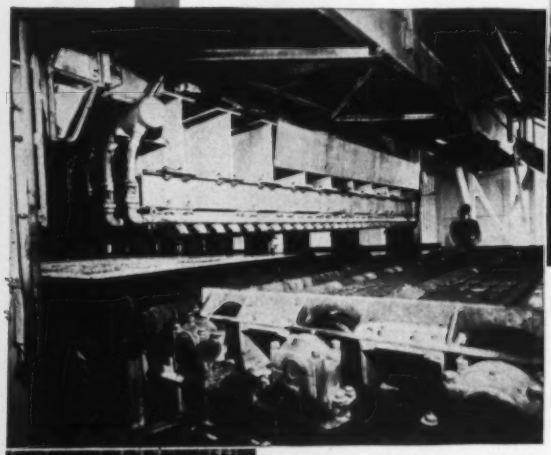


Hardening Furnace—has maximum temperature of 1750°F—approximately 18′ wide x 142′ long overall. Twenty-ton slabs can be moved forward, backward, faster, slower, under remote control of operator.

Original Drever Heat Treating Lines at Homestead consist of charge table, hardening furnace with pressure quench and, on left, charge table and oscillating furnace for annealing stainless steel.

Heated plate on transfer table leaving tempering furnace on right to enter pressure quench on left. One man (arrow) in control booth handles entire processing by means of "pushbutton" control.





2,500-ton pressure quench which holds plate while being flooded with 21,000 GPM of water. Except for very light gauges, plate so quenched will not require leveling.

DREVER ENGINEERING FOR YOU

Drever Company has built and is engineering wide plate heat treating and strip annealing lines for steel mills across the United States and around the world. At the same time, they are producing less massive equipment for sintering, annealing, vacuum heat treating, descaling and many other metal heat treating processes. Heat Treating Specialists since 1939, they have extensive experience in all phases of metal improvement through the use of heat and atmospheres. Consult with Drever Engineers about your own process requirements. Write or phone. Drever Company, Bethayres, Pa. Wilson 7-3400.

DREVER INDUSTRIAL FURNACES

ENGINEERED TO YOUR PARTICULAR REQUIREMENTS

ENGINEERING AND MANUFACTURING FACILITIES AROUND THE WORLD THROUGH ASSOCIATES IN FRANCE, GREAT BRITAIN, GERMANY, ITALY, JAPAN AND INDIA

Ready-Power switches to **Columbia-Southern Trichlor** to solve corrosion problem and save equipment in used motor degreasing

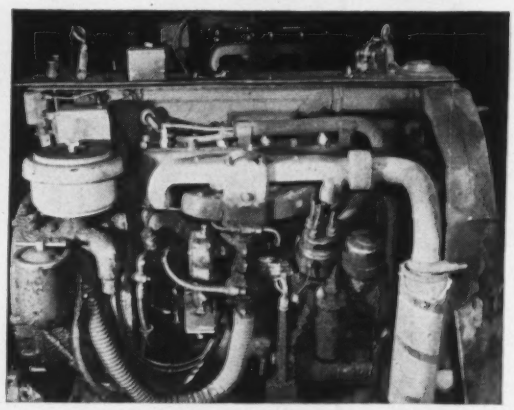
The Ready-Power Company of Detroit manufactures gasoline and diesel electric power units for fork-lift trucks, crane trucks, platform trucks and other materials-handling equipment. They also repair and rebuild used power units which have spent years in the most rugged kind of service. And this is where Columbia-Southern TRICHLOR comes into play.

The used power units, as received by Ready-Power, have been exposed to corrosive residues from fuel and lubricating oils, carbon black, salt, foundry dust, acid pickling materials and similar soils from virtually every type of industry. In service these contaminants build up a thick layer of grease and "gunk." Before Ready-Power's maintenance experts can diagnose and repair the units, the heavy coating of contaminants must go. A vapor degreasing operation proved to be the most efficient method of removing all soils down to the metal, without harm to any of the parts or surfaces.

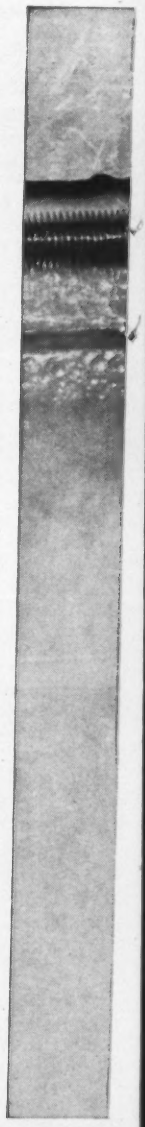
Soon after installing the vapor degreasing system, though, Ready-Power ran into a problem. The solvent they were using soured rapidly, due to the combination of materials the used power units had picked up in their years of heavy service. In fact, the active acid content of the solvent built up so quickly that it was corroding the tank. In a short time, replacement of the new equipment might be required.

At this point, the Trichlor distributor in Ready-Power's area—Progressive Chemical Company of Detroit—teamed up with the maintenance and production people at Ready-Power to eliminate the source of equipment corrosion. Because Columbia-Southern Trichlor has a heavy-duty stabilizer system built into it for just such operating conditions, the degreasing system was charged with Trichlor and put into operation.

Result: The corrosion which threatened to cause equipment replacement stopped immediately and had never resumed since *neutral* Columbia-Southern Trichlor has been on the job. Units come clean—fast and economically—thanks to Trichlor and helpful service from Progressive Chemical, the distributor.



Ready-Power must remove this heavy accumulation of grease, dirt and acidic soil before diagnosing and repairing used unit. Degreasing is the answer to low-cost, safe cleaning of units returned for service.



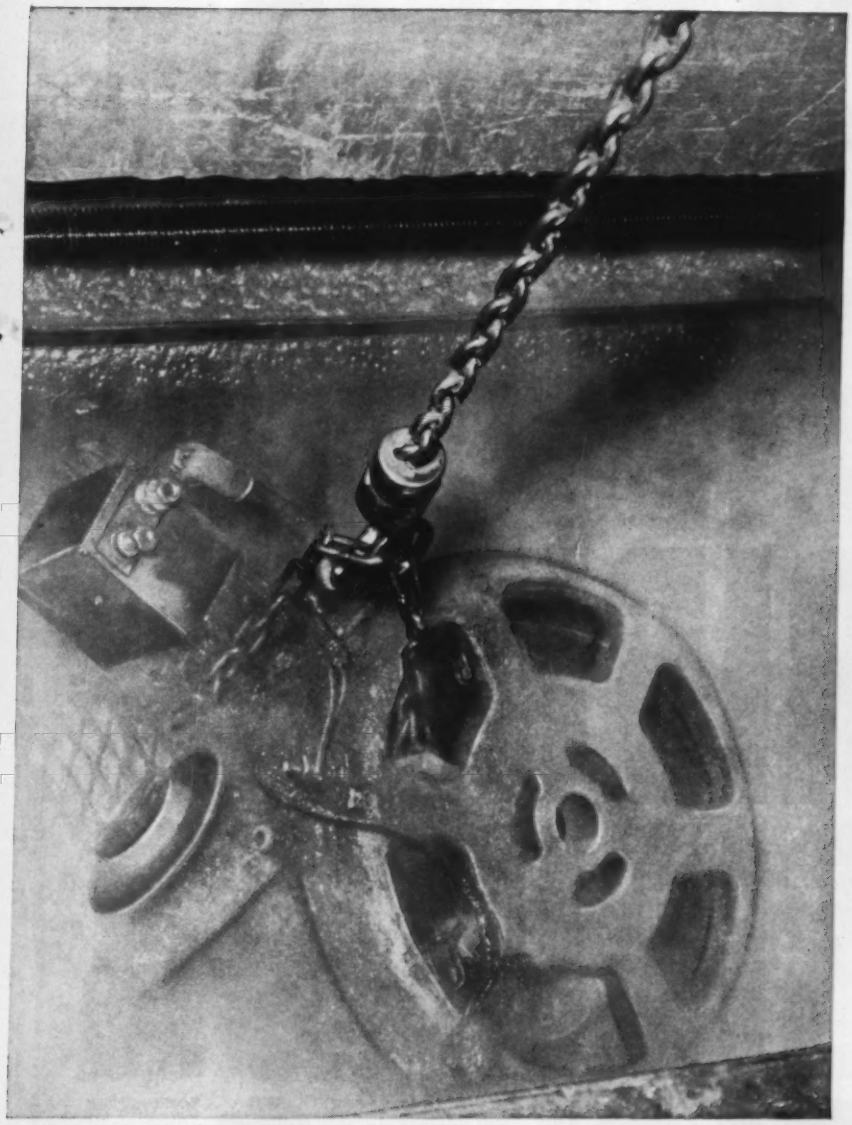
It's help like this, plus the consistently high quality of the product, that makes Ready-Power a steady user of Columbia-Southern Trichlor. Perhaps *your* operation could benefit, too. Why not call on your Trichlor distributor or the PPG Chemical Division office nearest you?

columbia | southern chemicals

CHEMICAL DIVISION

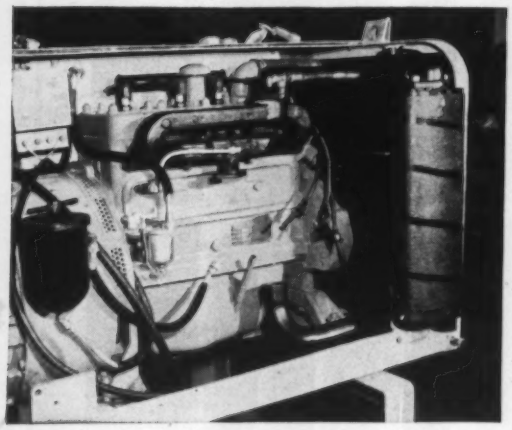
PITTSBURGH PLATE GLASS COMPANY

ONE GATEWAY CENTER PITTSBURGH 22, PENNSYLVANIA



Complete electric generator in vapor phase of Trichlor solvent.

Columbia-Southern Trichlor safely removes contaminants, yet protects the equipment with its heavy-duty neutral stabilizing system.



Rebuilt power units leave Ready-Power in first class condition; all defective parts repaired or replaced, and carrying the same warranty as new units.

Peter Balysh (right) of Ready-Power, and Rodger Lau, Columbia-Southern Trichlor Distributor, inspect soil conditions on a unit turned in for repair.

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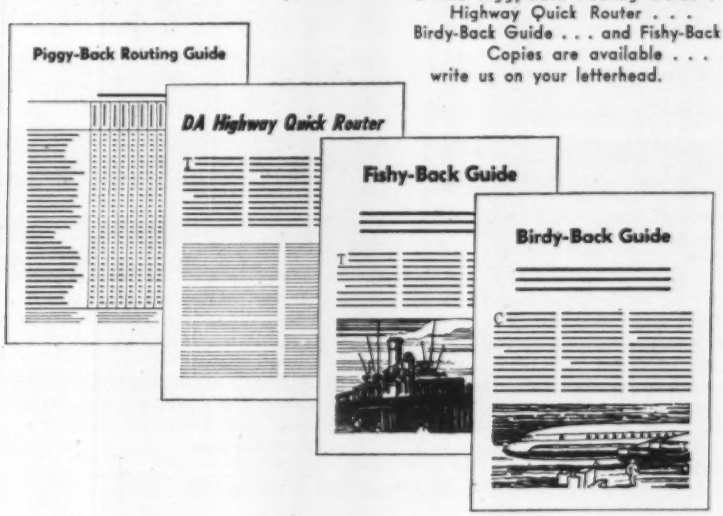
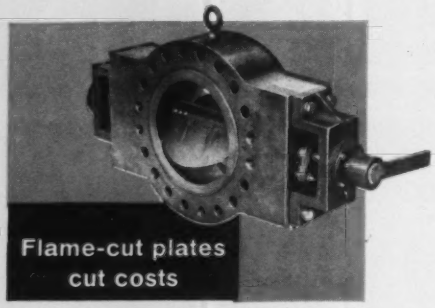
Distribution Age is the originator of the Piggy-Back Routing Guide . . . Highway Quick Router . . . Birdy-Back Guide . . . and Fishy-Back Guide. Copies are available . . . write us on your letterhead.



A Chilton Publication, Chestnut and 56th Streets, Philadelphia 39, Pa.

METALOGICS* IN



Flame-cut plates cut costs

HIGH REJECTS: Use of flat steel castings for valve bodies, with I. D. ranging from 4" to 60", accounted for increases in costs for this manufacturer. Pattern costs rose because of numerous changes . . . rejects were high due to porosity and other casting faults that showed up only after machining.

HIGH QUALITY: Ryerson recommended using flame-cut plates ranging in thickness from 1" to 8". Results: greater production flexibility, faster delivery, lower cost and a stronger product for this high-pressure service. Tight Ryerson quality control delivered plates of exceptionally clean surface to exact thickness of finished product, requiring little machining.

Machine cut rings solve problem

PLATES REQUESTED: Ryerson was asked to bid on supplying ¼" Type 410 stainless in 27½" square plates. Material was to be used for orifice plates for 16" burner, subjected to elevated temperatures.

RINGS RECOMMENDED: Going beyond material specs, the Ryerson representative found that the customer intended to cut plate into 27⅛"-diameter rings with 13.120" bore—and then mill 12 slots in outer diameter for expansion relief. Knowing the application, Ryerson recommended supplying machine-cut rings in which slots could then be punched rather than milled. Production savings enabled switching to Type 304 at less cost than Type 410 with slots milled.

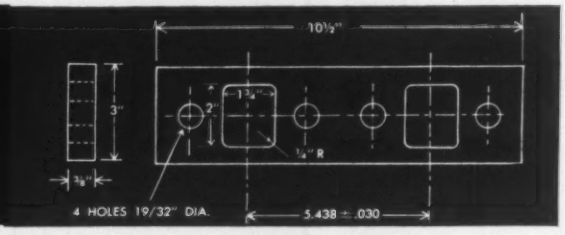
Look at these random examples and see how Ryerson Metalogics sparks real savings by continually searching for and suggesting new materials, methods and techniques.

The broadest experience anywhere combines with the widest range of stocks available to offer you unbiased recommendations on the best material for any job—be it steel, aluminum or plastics. Always the right metal-fabricating machine, too—for Ryerson is the nation's largest distributor.

Your Ryerson representative is "Metalogics-trained" to help you *value-analyze* selection, fabrication and application problems. Get his constructive ideas soon, and see how he can help you select and apply material from our vast stocks. It's the "Metalogical" thing to do.

**The Ryerson science of giving optimum value for every purchasing dollar.*

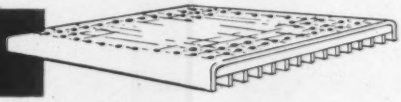
Saved: $100 per thousand



PROBLEM: Muffler manufacturer required accurately finished mounting plates made from ⅜" x 3" bar. Cutting bars to size, burning 1¾" x 2" holes and drilling four 19/32" holes proved time-consuming and expensive.

SOLUTION: Ryerson recommended that they eliminate cutting, burning and drilling operations by stamping the part from Ryerson forming-quality plate. One operation instead of three cut costs $100.00 per thousand pieces and quickly justified the small initial investment in dies.

Suggestion saves 85%



ASKED FOR: Customer wanted 1" hot rolled plate to cover about 80' of 24" open trench. Plate was to be cut into 24" x 27" segments—each containing 900 ⅜" holes to filter the product.

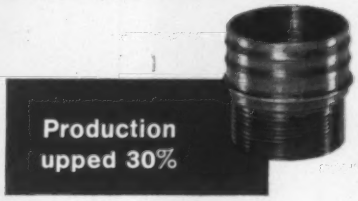
RECOMMENDED: After studying application and cost, Ryerson recommended a design combining perforated light plate, formed to channel shape, and grating for structural support. Ryerson experience and imagination saved 85% of the original cost.

Soft touch on fabricating sheets

THE NEED: Cold rolled sheets that would take severe forming and retain smooth, dull surface for high lacquer finish. Sheet quality was found on inspection to vary widely from one shipment to the next, causing variations in forming and finishing operations . . . high reject rate.

THE ANSWER: The Ryerson representative showed how our stringent quality controls would assure consistent quality on every shipment so that forming and finishing could be standardized for better results . . . lower production cost figures.

ACTION

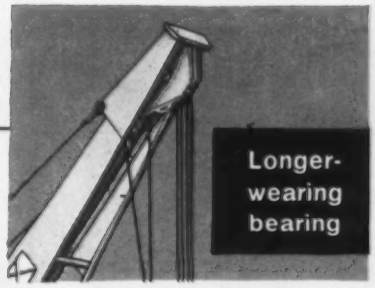


BEFORE: Job shop was using MT 1015 tubing in the manufacture of this coupling. Machinability was satisfactory, but rising costs of operation led to a search for ways to economize.

AFTER: Careful study by the Ryerson representative brought about a change in material. He recommended using Ledloy® 170 tubing, which increased machining speed to 170 s.f.m. and stepped up production 30%. Ryerson's stocks include the widest range of fast machining alloys—types and sizes to fit your every need.

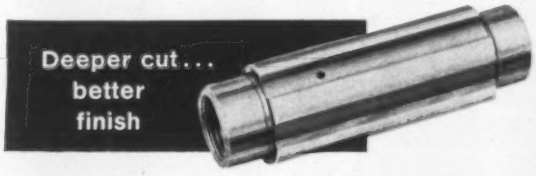
OLD WAY: A screw machine shop used nylon in the manufacture of nipple adapter and coupling nuts—until a Ryerson representative came on the scene.

NEW WAY: At his suggestion, they changed to Ryertex-Omicron PVC—cut costs 50%. PVC machined better—to closer tolerances, with improved finish . . . ran faster without "gumming." Note exact cutting of threads and barbs. Threads fit perfectly.



5-DAY LIFE: The sheaves that guide the enormous digging buckets of underwater dredges take a very severe load. Bronze bearing in the sheaves had to be replaced every four or five days.

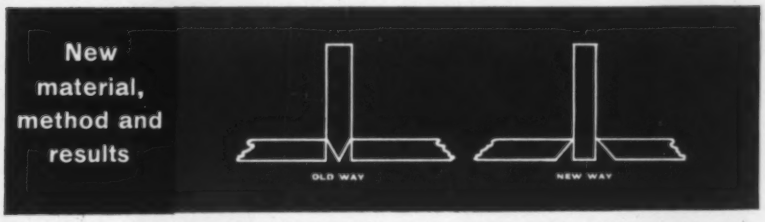
5 MONTHS, SO FAR: After discussing the problem with a Ryerson man, the chief engineer decided to try a bearing made of Ryertex. The change was made, and five months later hardly any wear was noticeable! With its low friction coefficient, Ryertex is nonbinding, even on itself.



SEARCH: Complicated machining of a carbide grade gear shaft included cuts up to ½". It was discovered that required machining was too slow with the steel chosen for the job.
ANSWER: Rycut® 40 was recommended by the Ryerson representative. This free machining alloy fit the situation perfectly. The company found that Rycut 40 machined at 250 s.f.m., gave a better finish, increased tool life, and lowered total per-piece cost. An alloy in the Rycut series may well lower your costs.

2 metalworking machines for the price of 1

A fabricator of stainless steel kitchen equipment was recently in the market for a new squaring shear. The one under consideration had a gap-type frame which would enable him to do an important notching operation—necessary for certain sink tops. After careful study, a Ryerson machinery specialist recommended *two* pieces of equipment instead of one at no increase in total cost. The first, an underdriven shear. The second, a universal-type sheet metalworking machine that would do the required notching, plus many other jobs—adding versatility to the entire operation.



OLD: Rows of vertical aluminum grid members were attached to an aluminum base plate by notching the grid members and welding. (2024-T3 aluminum plate was used.) However, upon cooling, welds fractured—causing a high reject rate on this assembly.
NEW: A Ryerson representative suggested undercutting the base plate (as shown) instead of the grid members. This exposed a greater area to heat and permitted a larger deposit of weld material. Another Ryerson suggestion: change material to 5052-H34 aluminum, which responds better to welding operations.

PRODUCTS IN STOCK

STEEL—carbon, alloy, and stainless steel—bars, structurals, plates, sheets and strip, tubing, etc.

ALUMINUM—sheet (including new building sheet), plate, coils, rod and bar, tubing and pipe, building products, etc.

INDUSTRIAL PLASTICS—Ryertex-Omicron PVC in all forms. Also Ryertex® laminated phenolic plastics for bearings.

METALWORKING MACHINERY—the broadest line available from a single source for every kind of metal fabrication. Also specialized line of material handling equipment.

RYERSON METALOGICS

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- **NEW** unique hydraulic amplifier shuts off tool at desired torque. This exclusive device results in...
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- **MORE ACCURATE** torque control with uniform results. Quick, easy adjustment...tamperproof.
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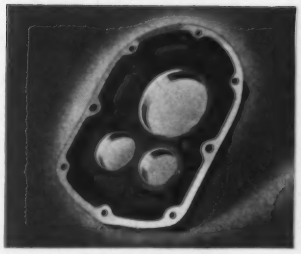
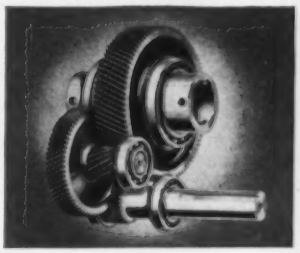
DODGE TORQUE-ARM, America's most widely used shaft mounted speed reducer, will save money for *you.* No foundation, no sliding motor base, no flexible coupling, no installation fuss. Developed and perfected by Dodge, this reducer has been so widely accepted in industry that it is now built and stocked in this unmatched range of sizes and models: capacities up to 170 hp; output speeds from 10 to 400 rpm; ratios of 5:1, 15:1, 25:1; speed ratios up to 175 to 1 with correct selection of speed reducer and V-belt drive. Built-in backstop available. Also positive overload release. Vertical models. Flange mounted models. Special application models... Go modern—go Torque-Arm! See your Dodge Distributor, or write us.

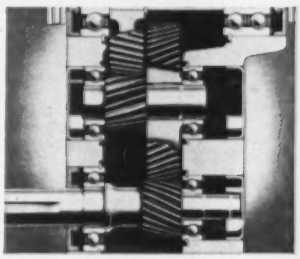
Dodge Manufacturing Corporation, 800 Union St., Mishawaka, Ind.



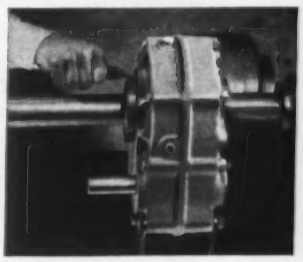
Rugged, semisteel housing holds bearing seats in line for entire life of unit. Laughs at loads. Corrosion resistant.



AGMA rated helical gears. Soft cores withstand shock; hardened surfaces defy wear. Teeth are crown shaved.



Gears are located *between* bearings and carry their loads without strain. Longer life, higher efficiency.



Unit slides completely onto shaft and locks on *both* sides of housing. This baby stays *put*—runs truer longer.

The Products with the Pluses... **DODGE** ***of Mishawaka, Ind.***

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Look under "Dodge Transmissioneer" in the *white* pages of your phone book. Factory trained by Dodge, he can give you valuable assistance.

If there are yellow pages in any steel in a hurry from

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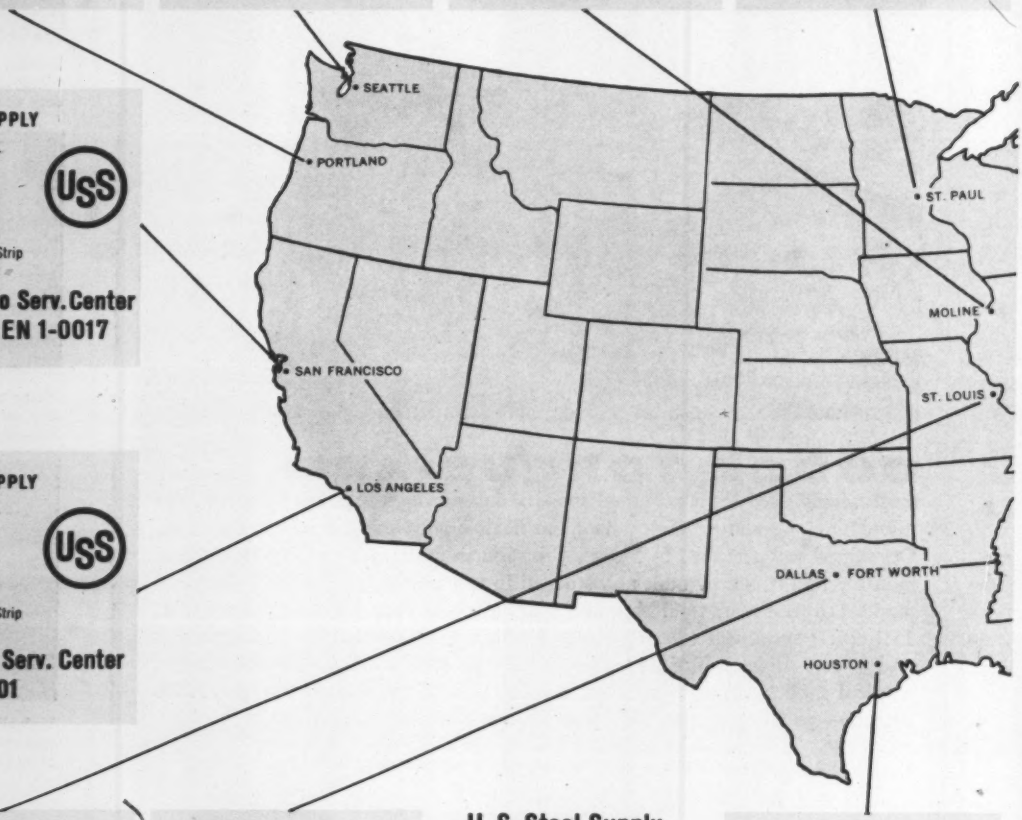

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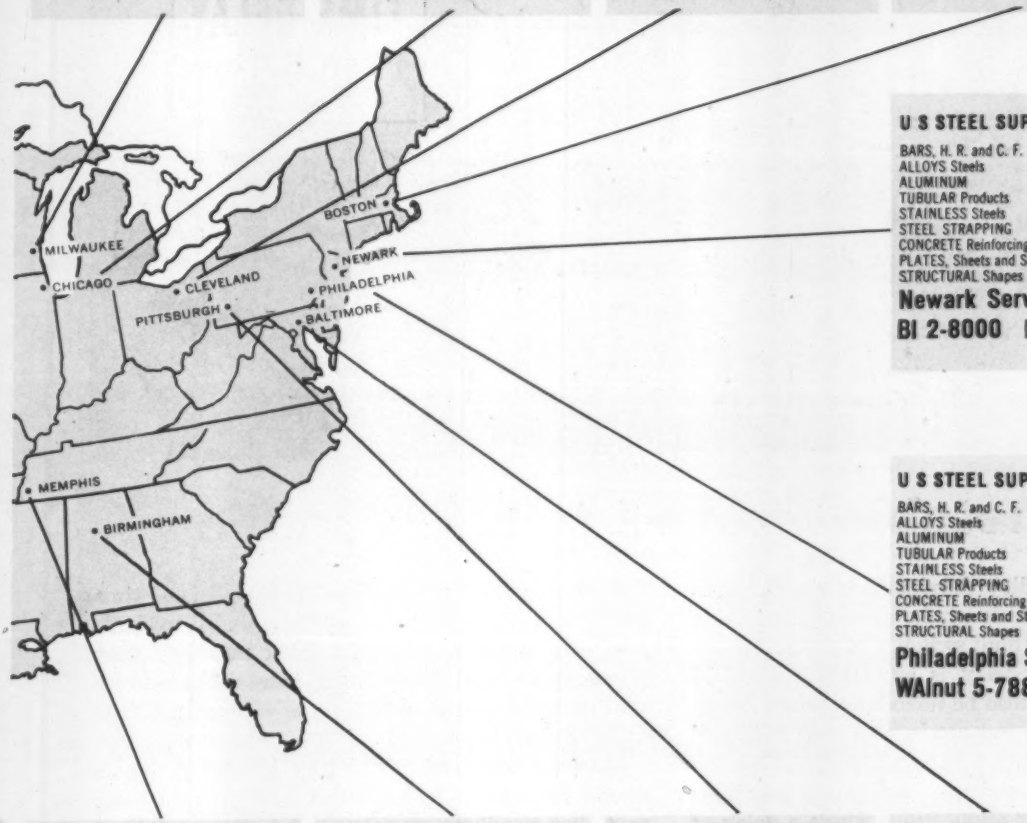

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Adjustable From 1 to 15 Seconds

This new Allen-Bradley development should solve such occasional problems where, upon the operation of the push button or limit switch, a slight time delay should occur. Time delay is adjustable up to 15 seconds—and it can also be introduced when "stopping" the operation—but not in both the "starting" and "stopping" cycle.

Both push-button and limit switch are relatively low in cost—ideal for applications where a delay of only a few seconds is desired, and where the repetitive accuracy of the Allen-Bradley Bulletin 849 time delay relay is not necessary. Both units have single pole, double break contacts—either normally open or normally closed. They are no more difficult to install than the corresponding units without the time delay feature.

Machine tool and production system designers should have full information in their files on these new Allen-Bradley time delay push buttons and limit switches. It is yours for the asking. Write today.

ALLEN-BRADLEY

Member of NEMA

Allen-Bradley Co., 1341 S. First St., Milwaukee 4, Wis. • In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

QUALITY MOTOR CONTROL

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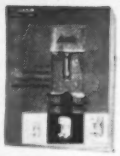
DENISON HydrOILics

How **STEWART-WARNER** produces 220 different assemblies on one **DENISON** Multipress and saves...

MONEY



THIS NEW SERIES "R" MULTIPRESS *assembles 220 different assemblies and prepares them for brazing at Stewart-Warner Corp., Chicago. Write for free Bulletin 324—New "R-S-T" Series Multipress.*

COST-SAVING versatility was a key requirement on this pressing job. To produce assemblies for a new product line, Stewart-Warner's Alemite Division needed a press set-up that could handle up to 220 different assemblies. And because of the short runs involved, fast changeover with minimum downtime was a must. *Installation of just one Denison hydraulic Multipress filled the bill.*

This Denison Series "R" 6-ton bench press, equipped with automatic index table and special "quick-change" tooling, assembles from 600 to 850 assemblies per hour. Finished parts are uniform, high-quality . . . *no rejects.* And tooling changes can be made in minutes to accommodate the full range of 220 different types and sizes.

A unique feature of this operation is an adjustable applicator mounted on the index table that automatically applies a metered amount of brazing compound to each two-piece assembly. It completely eliminates a former hand operation—*and does the job better.*

What's *your* problem? Ask the nearby Denison Production Specialist about a **M**ultipress **A**nalysis **P**rogram in your plant now. It can **MAP** new ways to cut your costs, get better quality finished products.

DENISON ENGINEERING DIVISION
American Brake Shoe Company
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HYDRAULIC PRESSES
PUMPS • MOTORS • CONTROLS

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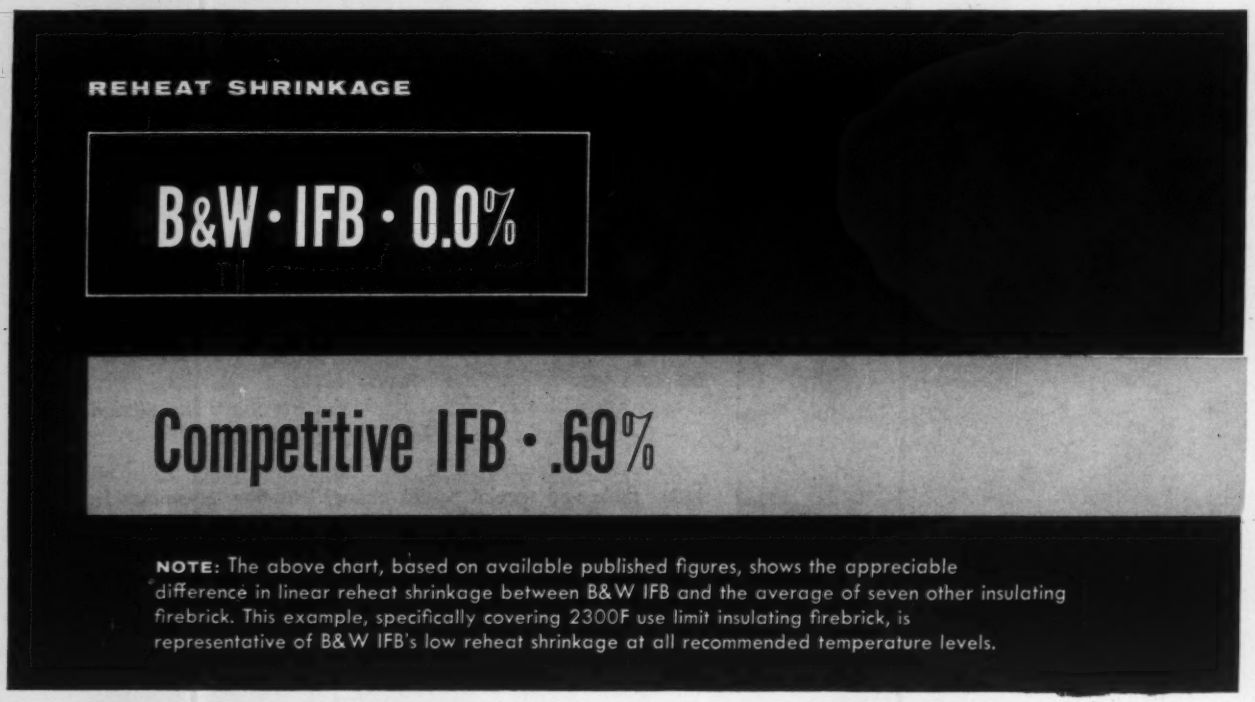
HYDRAULIC MULTIPRESS

Another *plus* of Lightweight B&W Insulating Firebrick

LOWER REHEAT SHRINKAGE means MORE STABLE


REHEAT SHRINKAGE
B&W · IFB · 0.0%
Competitive IFB · .69%
NOTE: The above chart, based on available published figures, shows the appreciable difference in linear reheat shrinkage between B&W IFB and the average of seven other insulating firebrick. This example, specifically covering 2300F use limit insulating firebrick, is representative of B&W IFB's low reheat shrinkage at all recommended temperature levels.

All insulating firebrick are not the same. Published figures show wide variations in *all* of the important properties among the leading brands of brick.

Take reheat shrinkage. This important property affects furnace stability, refractory life and fuel costs. Reheat shrinkage ranges from a B&W Insulating Firebrick low of 0.0% to a high of 1.5% for competitive insulating firebrick. The closest any other IFB comes to matching B&W IFB is 0.3%.

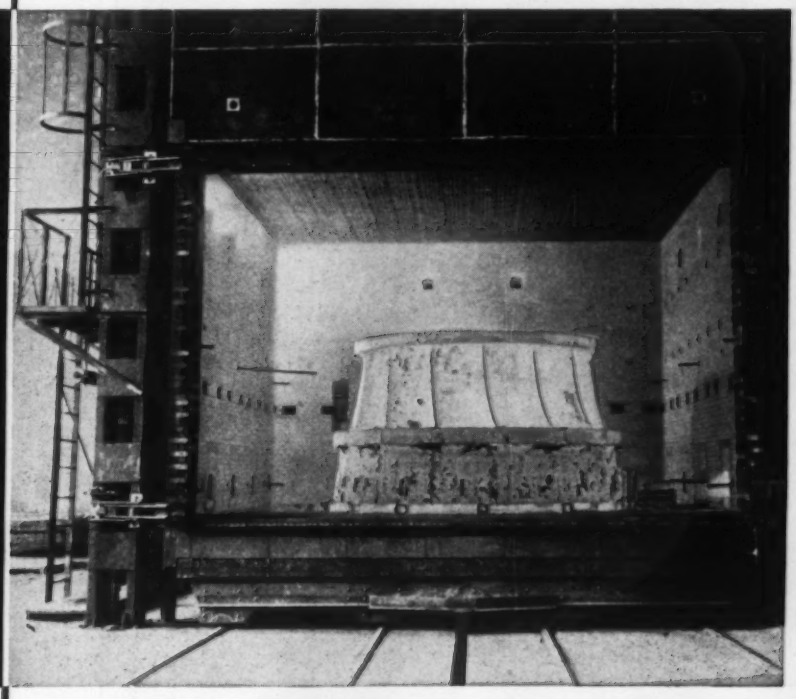
You are paying for insulating firebrick . . . make sure you get *all* the benefits. B&W—the originator of IFB—manufactures a full line of IFB with an experience-proved balance of light weight, high insulating value, high strength and long life.

For complete information on B&W Insulating Firebrick, write for Catalog R-38 to The Babcock & Wilcox Company, Refractories Division, 161 East 42nd Street, New York 17, New York.

ONE OF A SERIES

FURNACE CONSTRUCTIONS

the payoff



Stability means low maintenance —

This large car bottom annealing furnace has given years of low maintenance service because of the stability of B&W Insulating Firebrick. Furthermore, the high insulating properties of B&W IFB have resulted in lower fuel costs and close temperature control. This is just one of many proofs in our files that "there is an important difference in insulating firebrick."

B&W

THE BABCOCK & WILCOX COMPANY

REFRACTORIES DIVISION

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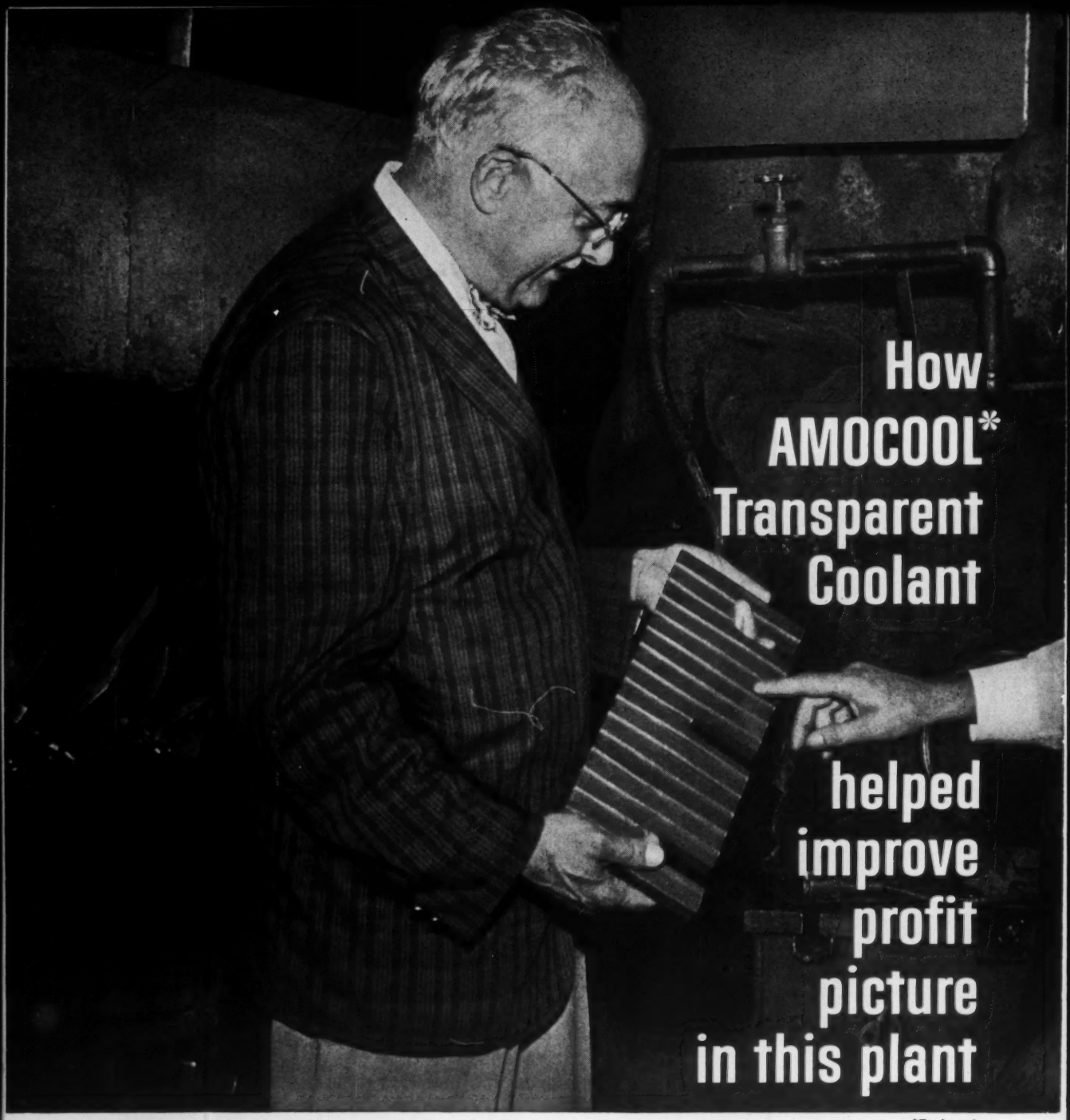


How AMOCOOL* Transparent Coolant helped improve profit picture in this plant

*Trademark

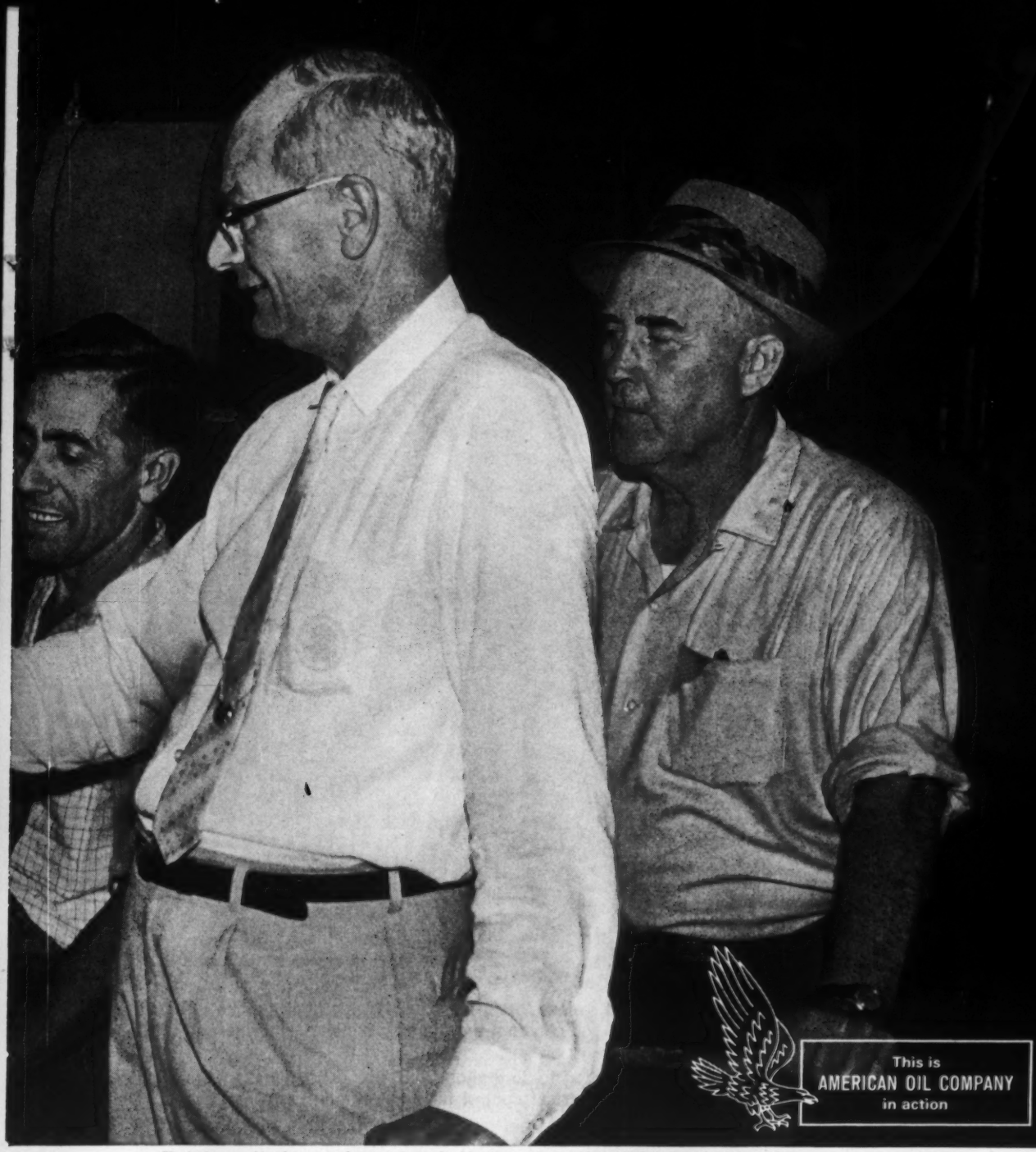
BY PAUL E. "PAPPY" STRATTON

About the Author. "Pappy" Stratton has been providing technical help on lubrication and metalworking problems to customers in the Detroit area for nearly all of the twenty-five years he has been working for the company. In addition to having this store of practical experience to help him, Pappy has completed the Company's Sales Engineering School.

* * *

By using a soap-base grinding compound, Detroit Edge Tool Company was getting excessive corrosion and rust on work and grinding machines. Oil vapor was collecting on machines and on the ceiling, causing dirty working conditions. Most important, high wheel loading was causing frequent down-time for wheel dressings.

We worked out a test program on AMOCOOL Transparent Coolant with the management. On our first test on one surface grinder, feed pressure was cut substantially while at the same time metal removal was increased.



Eliminate reworking because of rust, reduce wheel loading and extend intervals between wheel dressings; do these and you increase profit per unit, explains Detroit Edge Tool president, Dan Ebbing, to P. E. "Pappy" Stratton of American Oil. Plant manager, John Yonker (right) and Sam Vineh, operator, look on.

The cost of reworking parts to remove rust was eliminated. Time required to clean machines to get rid of the odor was cut in half. Less wheel loading and fewer wheel dressings have upped production and reduced costs. Our test program paid out in an improved profit picture. All grinding and drilling equipment has been converted to AMOCOOL Transparent Coolant.

* * *

Would you like this kind of technical help to assist you in improving profits? Get it by calling the American Oil Company office nearest you.

Quick facts about
AMOCOOL
Transparent Coolant

- Clear, transparent fluid
- Controls corrosion on work and machines
- All chemical. Does not support bacteria growth
- Unaffected by humidity
- Fire resistant
- Odorless

AMERICAN

AMERICAN OIL COMPANY
910 South Michigan Avenue
Chicago 80, Illinois

Some folks just buy our pushbuttons

We sell pushbuttons like this by the thousands.

They are working at more start-stop, fast-slow, up-down control jobs than you can shake a stick at.

We sell our starters, relays, brakes and other electrical control units by the piece, too. Fact is, you can spot the Clark nameplate somewhere in most any industrial plant.

Other customers want us to do the job from A to Z. So, our Clark staff has become top-rated in electrical control for automation.

We create control for the steel mill lines that handle super-tonnage. We direct the machinery that processes rubber. We keep production lines moving in the auto body plants.

This is why we say:

Whether it's a simple electrical component or a super-duper production line control, please, just push the button marked "Clark." 61PB1

THE CLARK CONTROLLER COMPANY

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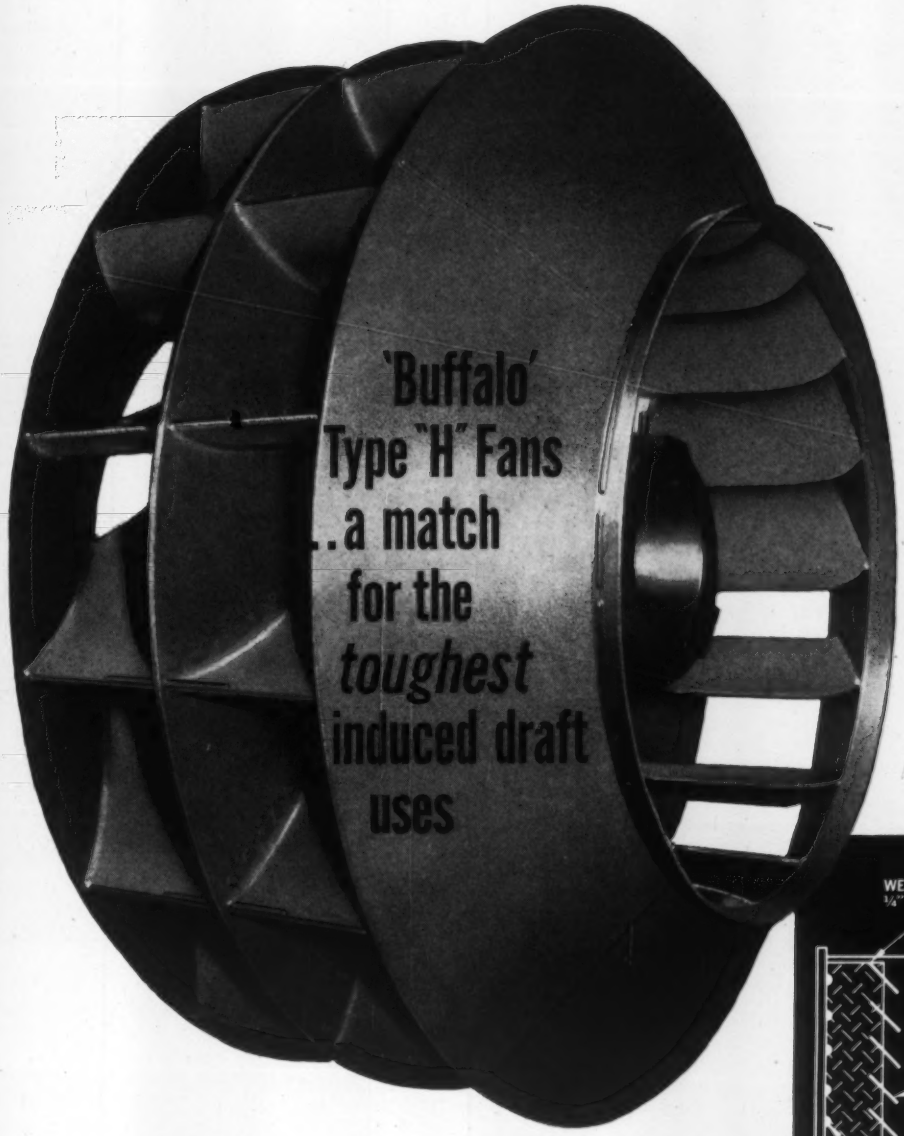

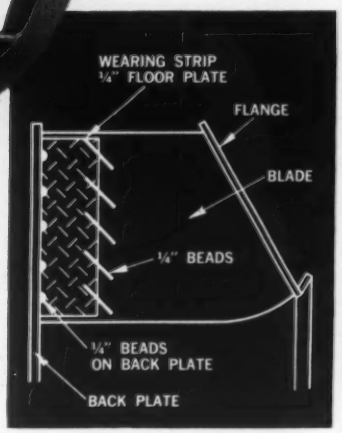

Designed for the most rugged induced draft applications, 'Buffalo' Type "H" Fans withstand continuous abrasive wear at the highest static efficiency ever obtained with this type fan. Radial tip blades curve smoothly forward at the heel to meet incoming air at the optimum angle. A modified flange design produces streamlined flow of air from wheel entrance to tips of the blades. Welded wear strips (¼" steel floor plate) break up particle flow and prevent dust particles from gouging or scouring the blades. Particle buildup is eliminated... housing wear is negligible... turbulence is minimized. In addition, static pressure and capacity are increased... maintenance costs and sound levels lowered. 'Buffalo' Type "H" Fans are available in 15 sizes and a variety of widths for various capacity/pressure requirements. For all the facts, call the resident Buffalo representative nearest you. Or write our home office direct.

"Buffalo"

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BUFFALO FORGE COMPANY

Buffalo, New York

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

'Buffalo' Air Handling Equipment to move, heat, cool, dehumidify and clean air and other gases.

'Buffalo' Machine Tools to drill, punch, shear, bend, slit, notch and cope for production or plant maintenance.

'Buffalo' Centrifugal Pumps to handle most liquids and slurries under a variety of conditions.

Squier Machinery to process sugar cane, coffee and rice. Special processing machinery for chemicals.

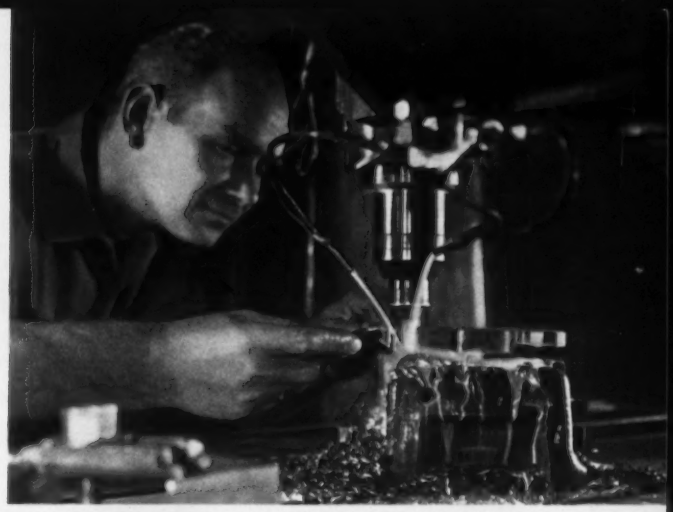
Wilson Specialty reports longer tool life, with Gulfcut® Heavy Duty Soluble Oil...

It's no easy task to machine an actuator support fitting assembly for a B-58 supersonic jet bomber. This calls for a company with a first-rate reputation in tough, complex machining jobs. The Wilson Specialty Manufacturing Company, Fort Worth, Texas, is such a company!

"Quite often, we find ourselves working with Titanium alloy and VascoJet 1000—two expensive materials," says Roy Watson, President. "And naturally, we've got to have a coolant which removes heat swiftly and gives us good tool life and a fine finish.

"Needless to say, we're fussy about cutting oils. In fact, we tried more than 8 different coolants before we settled on Gulfcut Heavy Duty Soluble Oil.

"We've found that a mixture of 20 parts water to one part oil provides effective cooling and lubricity



End milling Titanium alloy on a 3-dimensional Hydro-Version Arrow Profiler. The part is an actuator support fitting assembly for a B-58 jet bomber. The coolant is Gulfcut Heavy Duty Soluble Oil.

Roy S. Watson, right, President of Wilson Specialty, shows Frank P. Mauro, Gulf Sales Engineer, a Titanium part. Wilson Specialty tried 8 cutting oils—found Gulfcut Heavy Duty Soluble Oil to be the best!

Milling groove in B-58 actuator support fitting assembly. Gulfcut Heavy Duty Soluble oil has improved tool life and increased feeds and speeds.

higher feeds and speeds
GULF MAKES THINGS RUN BETTER!

in our operations. Tools last longer. Feeds and speeds are higher. And our rejection rate is lower. Gulfcut Heavy Duty Soluble Oil deserves much of the credit."

If you're faced with a stubborn machining problem, give us the opportunity to show you how Gulf makes things run better! Call a Gulf Sales Engineer at your nearest Gulf office. Or write for Gulfcut literature.

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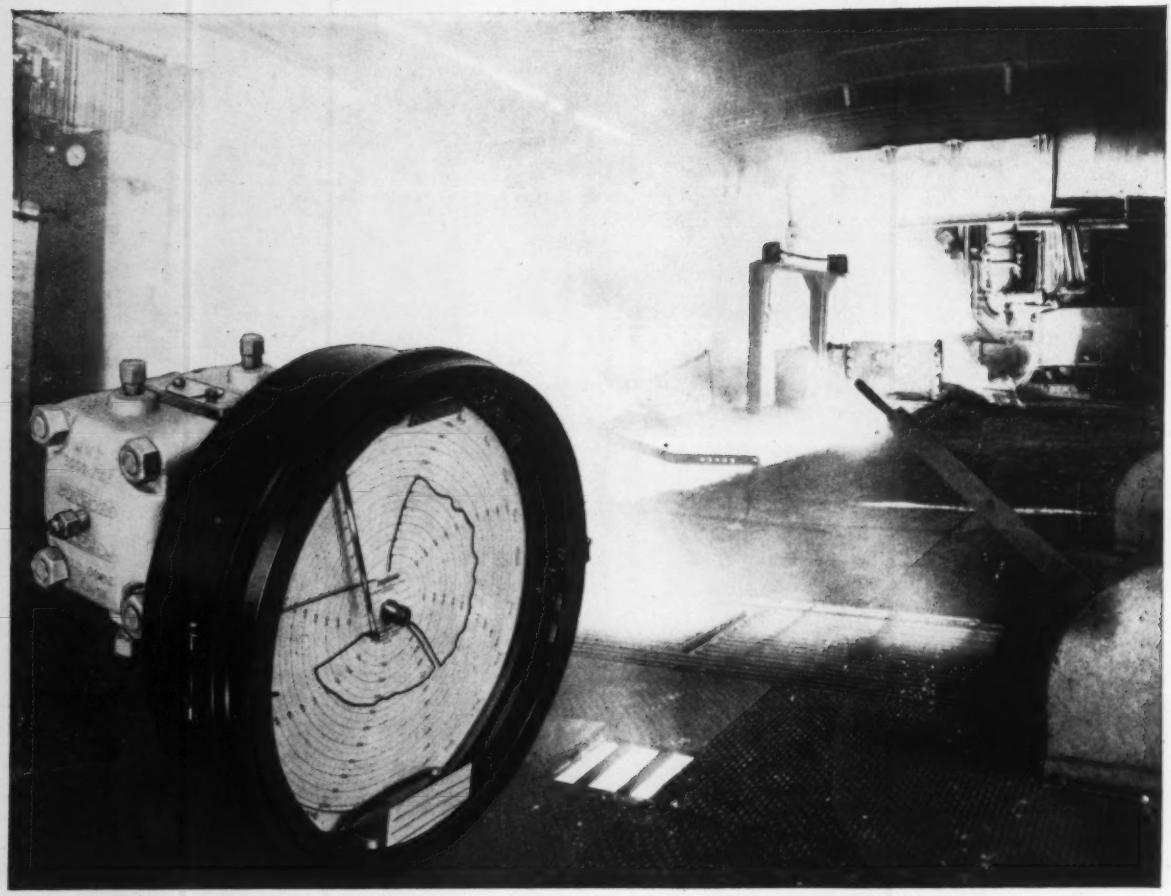
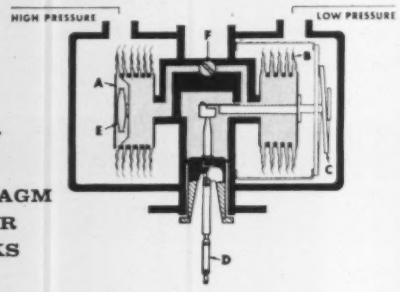


Dirty gas can't foul this flow meter

HOW THE DIAPHRAGM METER WORKS



In the schematic drawing above, areas shown in gray represent a stable, non-freezing liquid which never comes in contact with the process fluid. Any pressure increase in the high pressure chamber compresses diaphragm unit A, displacing its liquid and expanding diaphragm unit B until the force of range spring C equals the difference between the forces of the two diaphragm units. Linear motion of diaphragm unit B moves inner end of drive bar D — outer end moves correspondingly through the bellows – sealed flexure bar, driving pen arm.

Blast furnace gas, coke oven gas, natural gas, steam, water — you can measure them all with the Foxboro Type 37 Diaphragm Flow Meter and never worry about mercury contamination.

That's because the Diaphragm Meter has *no* mercury. In this meter, expansible Type 316 s.s. diaphragm elements convert differential pressure into accurate, dependable pen arm motion — automatically compensated for ambient temperature effects. There's no mercury to clean or replace — no loss of accuracy due to clogging.

Even with dirty gas, the exclusive design of the Foxboro Diaphragm Meter's range-springs and diaphragm elements assures lowest maintenance — highest sustained accuracy of any "dry" meter.

The Type 37 handles flow measurements over a wide range of differential pressures — at static pressures up to 2000 psi. Get full details by writing for Bulletin 7-15. The Foxboro Company, 809 Neponset Avenue, Foxboro, Massachusetts.

FOXBORO
REG. U.S. PAT. OFF.
***FIRST* IN FLOW METERING**

Throughout the steel industry, the Blaw-Knox name means exceptional service and the highest standards of performance. Behind this name are the engineering force and plant capacity necessary to meet steelmakers' most advanced requirements for modern automatic equipment. Blaw-Knox Company, 300 Sixth Avenue, Pittsburgh 22, Pa.

BLAW-KNOX

a

b

c

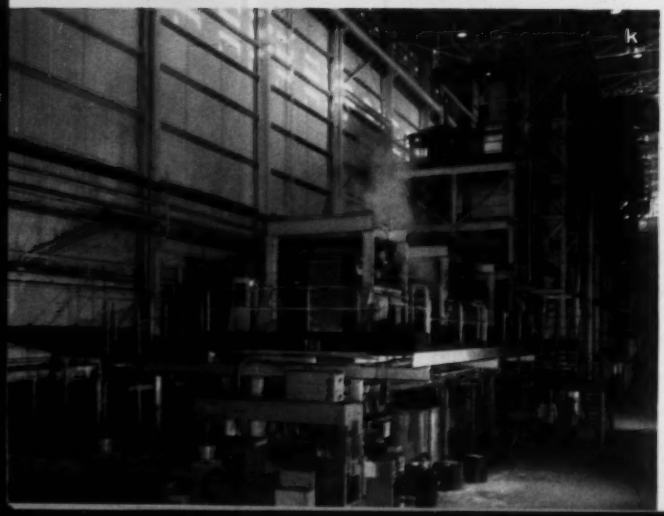
Rolling Mills and Processing Equipment for Shape Rolled Products

a Combination 46- x 114-inch Blooming-Slabbing Mill and 38- x 53- x 114-inch 4 high Plate Mill. b Wide Flange Beam and Structural Mill. c Merchant Mill.

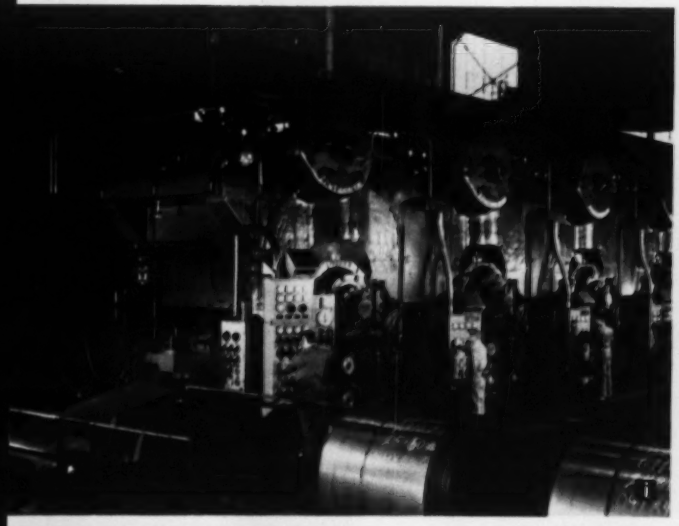
Rolling Mills and Processing Equipment for Shape Rolled Products (Continued)

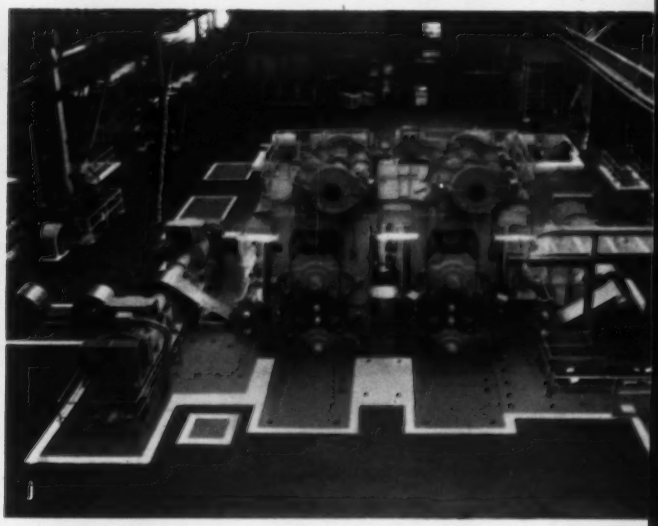
d Continuous Butt Weld Pipe Mill. **e** High Speed 2-roll Straightener in Cold Drawn Bar Line. **f** Roller Straightener for Hot Rolled Angles.

BLAW-KNOX



BLAW-KNOX





Rolling Mills and Processing Lines for Flat Rolled Products

g 46- x 90-inch Universal Slabbing Mill. h 56-inch Hot Strip Mill. i 60-inch Tandem Cold Strip Mill. j 19- and 53-inch x 48-inch Twin Temper Mill. k Continuous Annealing Line. l Electrolytic Tinning Line. m Continuous Galvanizing Line.

n **Iron, Alloy Iron, Steel and Alloy Steel Rolls.**

o **Foundry Products:** Peels, Slag Pots, Charging Boxes, Ingot and Charging Cars, Ladles, Trunnions and Rings, Blast Furnace Hoppers and Bells.

p **High Alloy Castings:** Radiant Tube Assemblies, Furnace Parts, Continuous Annealing, Conveyor, Feeder, Deflector and Zinc Rolls, and Heat Exchanger Elements.

q **Steel Plant Equipment:** Ladle Additions Feeders, Autopours,® Dolomite Machines, Water-cooled Doors, Frames, and Reversing Valves.

BLAW-KNOX

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o

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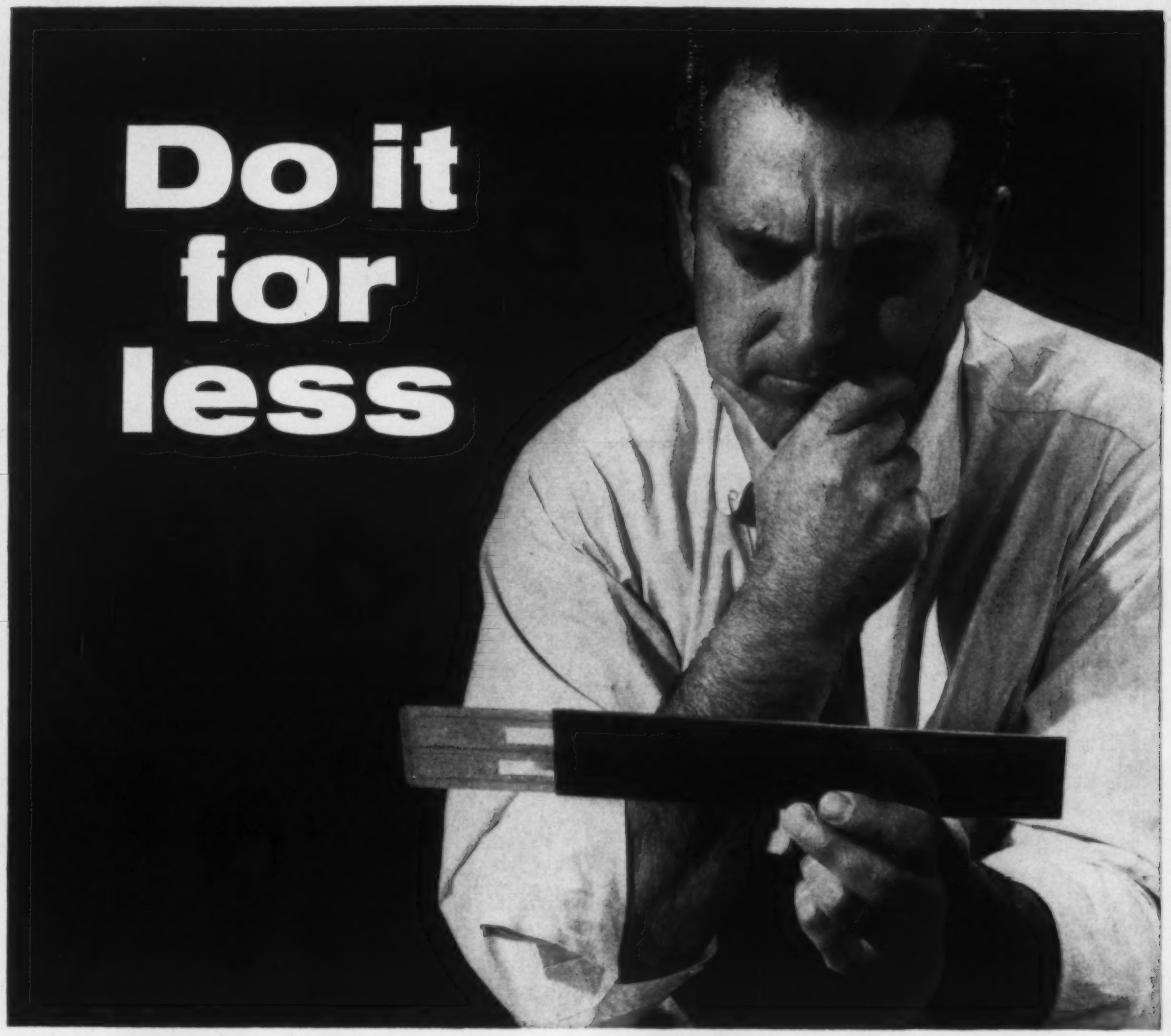
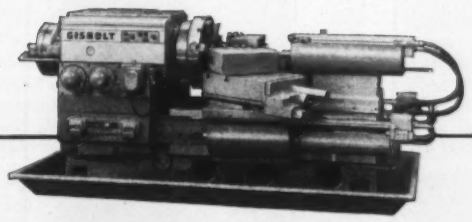
q



ON A GISHOLT AUTOMATIC CHUCKING LATHE



Gisholt Masterline No. 24 automatic production lathe

Rugged, versatile lathe for large parts—ring and bevel gears, bearing races, pellet mill forgings, oil country parts, diesel cylinder liners and heads.

Swing—35¾"...36" between centers...Up to 125 hp motor for maximum metal removal with carbides.

Single- or multiple-pass JETracers add versatility, cut setup time and tooling costs.

Ask for Catalog 1213

No matter how it's figured, old lathes can't compete with modern automatics. Low metal removal rates —wasted manpower—high maintenance—all cut into profits.

Lot sizes are no longer the deciding factor. JETracers and new, faster setup methods make today's automatic practical for long or short run operations. To meet your needs, Gisholt now offers six automatic turret lathes and four single spindle automatics.

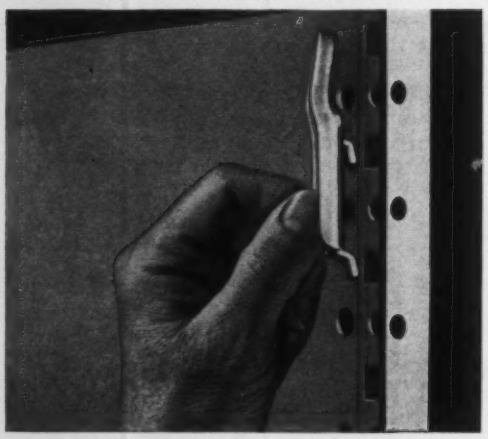
Ask your Gisholt Representative to show you how the *right combination* will give you peak efficiency on first and second operation work and cut your manpower requirements in half!

GISHOLT
MACHINE COMPANY
Madison 10, Wisconsin, U.S.A.

Turret Lathes • Automatic Lathes • Balancers • Superfinishers • Threading Lathes • Factory-Rebuilt Machines with New-Machine Guarantee

Republic Steel Lockers were selected by a leading West Coast manufacturer for their new wash-change-dress facilities. Republic Box Type Lockers on the outer wall are used for storing and protecting valuable employee tool kits. For complete planning and installation assistance, call your Republic representative, or write today.

THE NEW REPUBLIC SHELF CLIP is designed to ease and speed erection: to provide quick rearrangement of parts without dissassembling the unit; and to assure a sturdy, rigid, installation. Republic Clip Shelving saves valuable floor space, saves time and money too. Call or write for more information.



REPUBLIC METAL LUMBER® provides faster, stronger, safer framing in any application where common building materials are now used. Simply measure, cut, assemble. Stronger, safer—fabricated from cold rolled steel for high strength-to-gage ratio. Bonderized. Available in two gages, two widths, in standard bundles of 10- or 12-foot lengths. Send for attractive brochure.

good locker planning starts with

REPUBLIC STEEL LOCKERS

Good locker planning—attractive wash-change-dress facilities—pays-off in improved employee relations and increased production. And, good locker planning is easy with Republic Steel Lockers.

Republic's Berger Division Planning and Engineering Service will help you all the way. They will outline a floor plan to utilize your valuable floor area, and they will recommend the proper Republic Steel Locker for your operations. They will give you a firm delivery date, and assume full responsibility for complete installation.

Republic Steel Lockers offer industrial management decided advantages in service and economy, too. Big and roomy interiors are spacious and well designed for convenience and good ventilation. Strong and sturdy, made of steel to assure complete protection of personal effects and tools.

Bonderized! This Republic feature provides a superior base for the baked enamel finish. Offers protection against rust and corrosion—restricts bumps, scratches, abrasions of everyday service to the site of the injury. And, reduces maintenance costs to a minimum.

Republic Steel Lockers are available in a wide range of sizes and styles with box type lockers attached or separate for protecting tool kits. Your choice of any of the popular locking devices.

To learn more about the many advantages of Republic Steel Lockers, call your Republic representative. Or, write direct.

Steel Strong . . . Modern . . . Dependable

STANDARD REPUBLIC MATERIAL HANDLING UNITS move raw materials and parts through production lines to shipping faster, easier. Strong, sturdy Republic Units are designed to withstand abuse of everyday, workday service. Let Republic's Berger Division Material Handling Specialists work with you in solving material handling problems. Write for more information.

REPUBLIC STEEL

REPUBLIC HAS THE FEEL FOR MODERN STEEL

REPUBLIC STEEL CORPORATION
DEPT. 1A-1690-A
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

Please send more information on the following products:

☐ Republic Steel Lockers ☐ Republic Clip Shelving
☐ Republic METAL LUMBER® ☐ Material Handling Units
☐ Please have a Republic representative call

Name_____ Title_____

Firm_____

Address_____

City_____ Zone____ State_____

Three great names in couplings

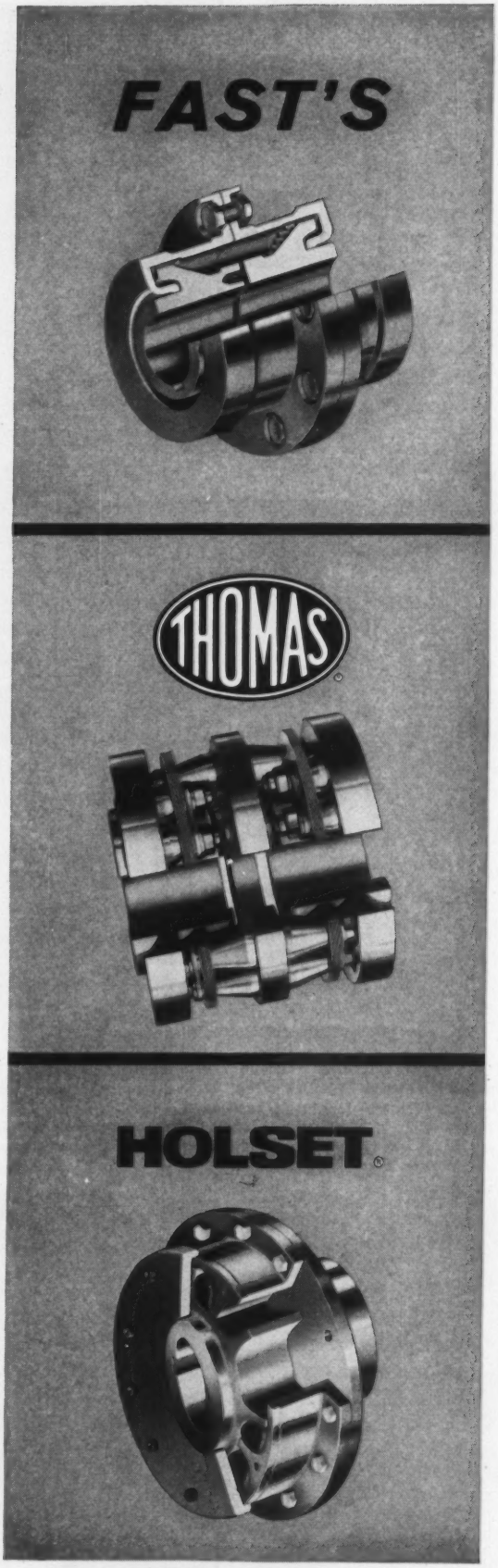
NOW CARRY THIS CORPORATE SYMBOL

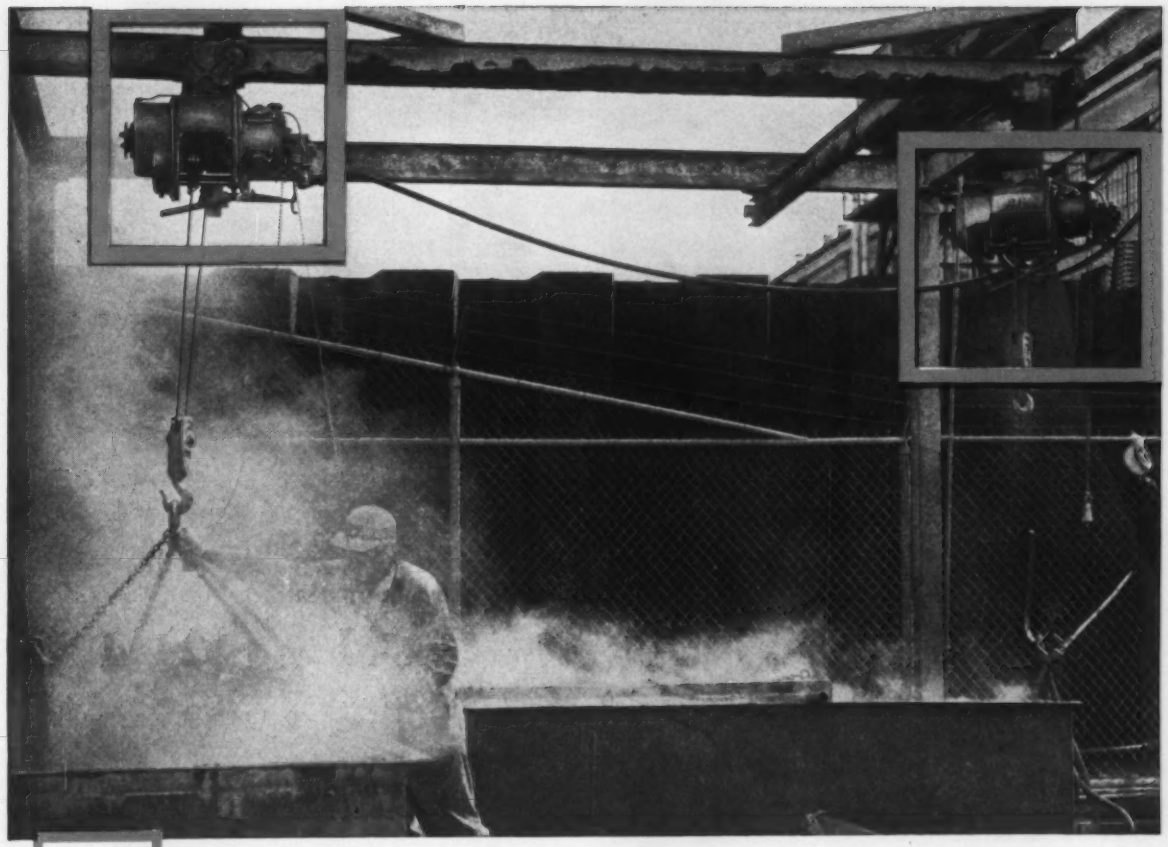
KOPPERS®

With the acquisition of the Thomas Flexible Disc Coupling line, Koppers now provides engineering solutions to a wide range of industrial coupling problems. Need a lubricated gear-type coupling for transmitting high loads? Koppers world-famous Fast's coupling line does the job on shafts up to 32 inches. Need a maintenance-free flexible-disc coupling with no backlash? The highly engineered Thomas line holds the answer—with miniature couplings as small as 1/12th of an ounce. Need a coupling to absorb impact or vibration? The Holset line of resilient, non-lubricated couplings protects equipment in most diesel, compressor and shock load applications.

Because each of these coupling lines has its particular application in industry . . . and because each is a recognized name in the power transmission field . . . you can continue to buy them by brand—just as you have in the past. Of considerable importance are the experienced, extensive engineering and manufacturing services of the entire Koppers organization that are available to help you with your power transmission problems . . . in any size, in any quantity, for any use.

KOPPERS COMPANY, INC.
COUPLING DEPARTMENT
Baltimore, Md. • Warren, Pa.
Engineered Products Sold with Service





AIR HOIST *is safe from corrosion ... can't cause explosion!*

The air motors that power Ingersoll-Rand AIR hoists are unaffected by fumes, vapors or moisture. Dust and dirt cannot get in to cause premature wear or corrosion and interfere with the hoist's operation. And . . . because the motor is operated by air, not electricity, there can be no sparks which could set off a damaging, even lethal, explosion.

Maintenance of Ingersoll-Rand hoists is unbelievably low—electrical contacts, switches and windings cannot cause trouble because these hoists are powered by air!

PROTECTS LIVES, LOADS, PROPERTY...

Loads can't "run away" even if air supply should fail.

PRECISE FINGER-TIP CONTROL, INFINITELY VARIABLE SPEEDS...

Simple, foolproof, air throttle permits "stepless" speed control of loads.

Over 110 different sizes of Ingersoll-Rand AIR hoists (capacities from 200 to 24,000 lbs.) are available to solve your lifting problems. For details, or a demonstration, call your nearby Ingersoll-Rand representative.

Ingersoll-Rand

11 Broadway, New York 4, N. Y.

Planned Annual Retooling increases output per man

217A-8

New technique makes possible easy-to-machine steel extrusion dies from molybdenum

At 4600°F thorium becomes a liquid. Bismuth boils. Antimony vaporizes.

But molybdenum remains hard.

To help you take advantage of molybdenum's hardness — and heat resistance — Sylvania now makes available molybdenum for forging into extrusion dies for steel, titanium and other metals. Thanks to its new isostatic pressing and sintering operation, molybdenum powder of controlled particle size can be formed into forging blanks that permit you to produce intricate shapes and patterns for your dies. Because of molybdenum's high temperature characteristics, these dies far outlast conventional dies. Sylvania also produces billets and ingots for forging, electrodes for arc casting, blanks for machining and machined parts.

Shouldn't you consider refractory metals in meeting your needs? The same properties that solve the problems of throat inserts for rockets and missiles can work for you in piercing points, die-casting dies and cores, in truing grinding wheels and in many other ways. For the full story or help in checking out a special idea write Chemical & Metallurgical Division, Sylvania Electric Products Inc., Towanda, Pennsylvania.

SYLVANIA

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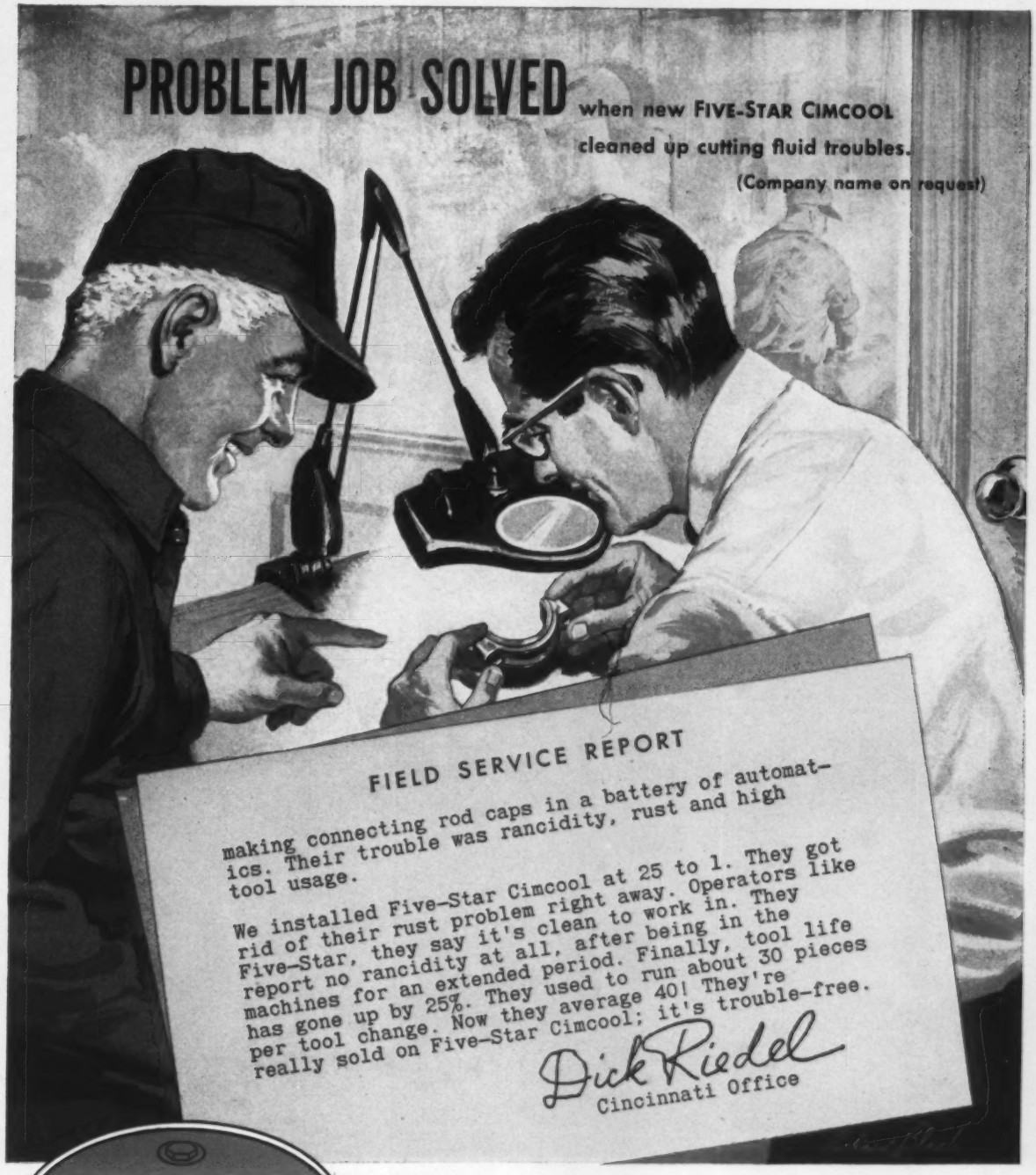
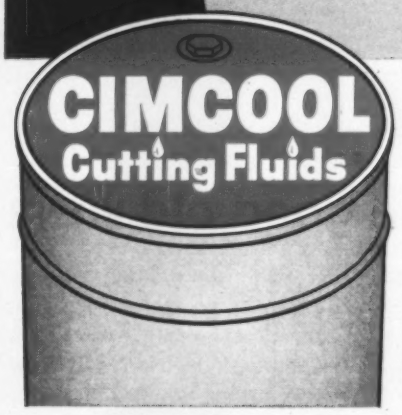
GENERAL SYSTEM

PROBLEM JOB SOLVED

when new FIVE-STAR CIMCOOL cleaned up cutting fluid troubles.

(Company name on request)


FIELD SERVICE REPORT
making connecting rod caps in a battery of automatics. Their trouble was rancidity, rust and high tool usage.
We installed Five-Star Cimcool at 25 to 1. They got rid of their rust problem right away. Operators like Five-Star, they say it's clean to work in. They report no rancidity at all, after being in the machines for an extended period. Finally, tool life has gone up by 25%. They used to run about 30 pieces per tool change. Now they average 40! They're really sold on Five-Star Cimcool; it's trouble-free.
Dick Riedel
Cincinnati Office



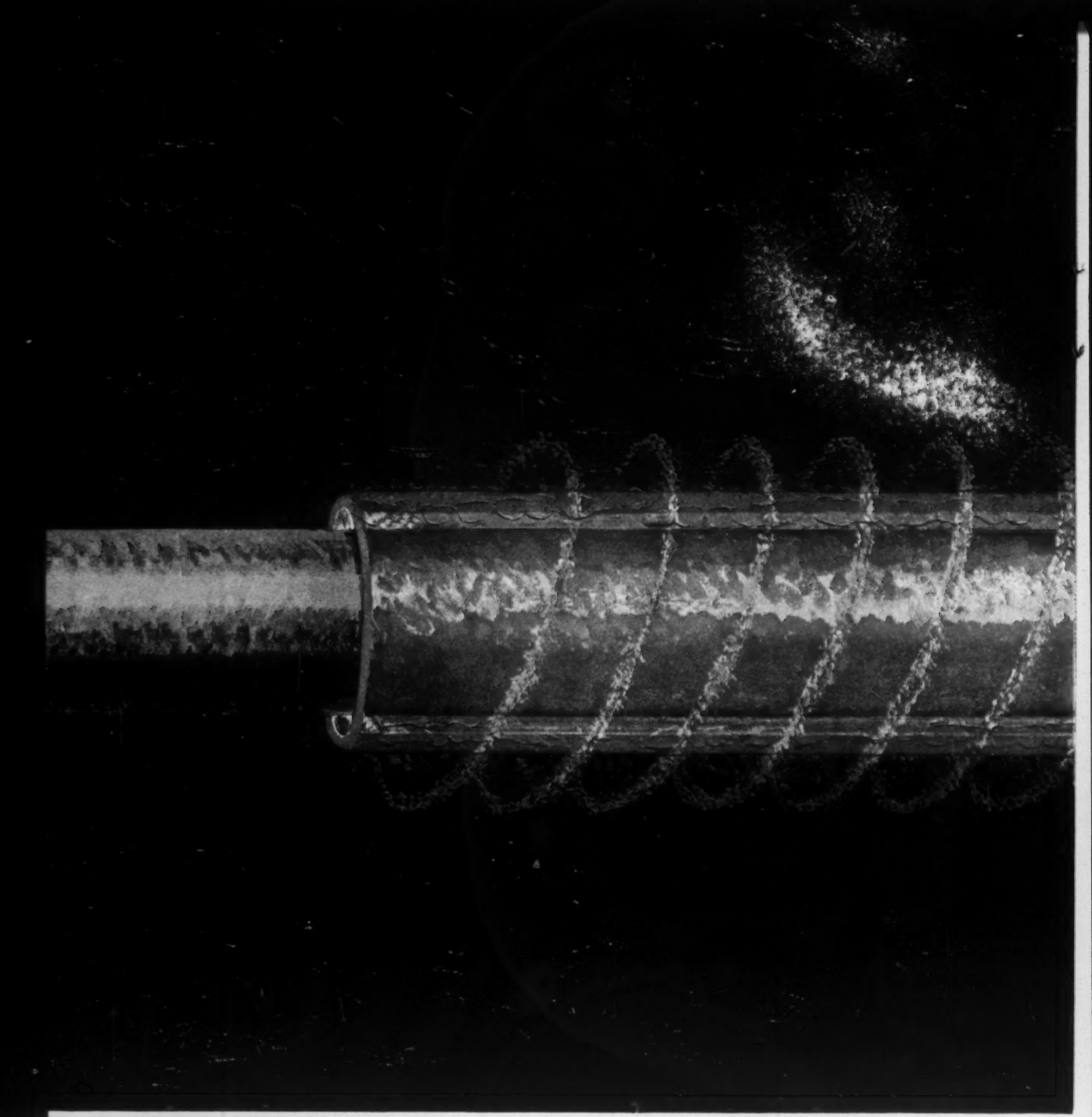
FOR 100% OF ALL METAL CUTTING JOBS

Production-Proved products of The Cincinnati Milling Machine Co.

FIVE-STAR CIMCOOL—Newest in the industry-proven line of CIMCOOL° Cutting Fluids.
CIMPERIAL° — Heavy duty replacement for cutting oils in those low-speed tough jobs.
CIMPLUS — The transparent grinding fluid which provides exceptional rust control.
CIMCUT Concentrates (AA, NC, SS) — For every job requiring an oil-base cutting fluid.
ALSO—CIMCOOL Tapping Compound—CIMCOOL Bactericide—CIMCOOL Machine Cleaner.

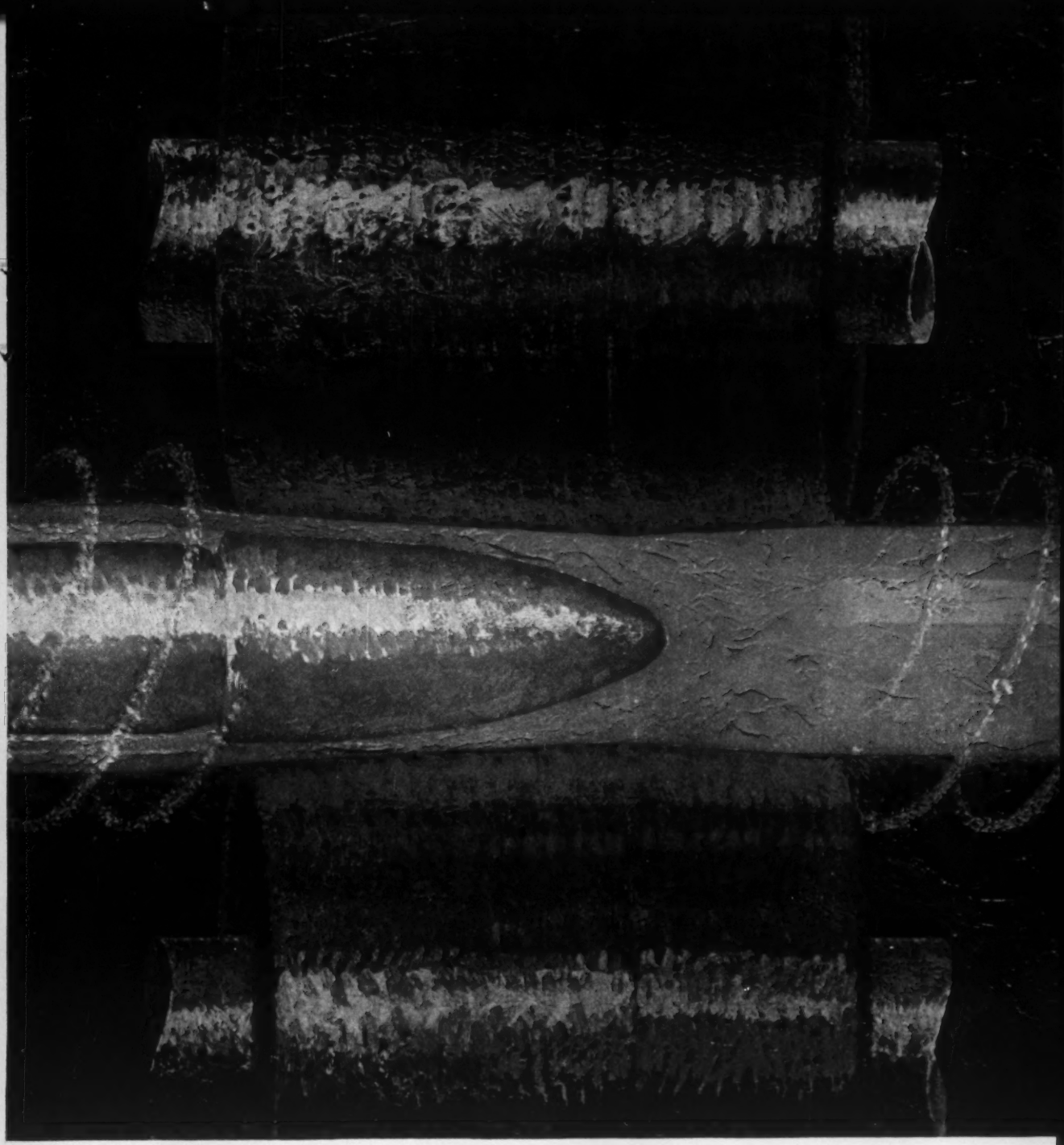
For full information on the complete family of CIMCOOL Cutting Fluids, call your CIMCOOL Distributor. Or contact Cincinnati Milling Products Division, Cincinnati 9, Ohio.

°Trade Marks Reg. U.S. Pat. Off.



Remember the good old ways

This mark tells you a product is made of modern, dependable Steel.



The piercing operation is one of the first steps in creating seamless pipe or tubing from a solid section of steel. After we set the hot steel billet in place, we ram it. Spin it. Push its insides out. And stretch it into a hollow many times longer than the original piece of steel.

There's nothing new about making seamless tubular products this way—we've been doing it for 70 years. This doesn't mean that we're old-fashioned—but sometimes the old ways are best. Whether we use an old established method or a revolutionary new one, whatever is the best way to make pipe or tubing is how National Tube makes it.

USS is a registered trademark

USS

National Tube Division of United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors

United States Steel Export Company, New York

GRAY Flying Scot above is 42" x 28'
with two rail heads
and special duplex table.

26 page Bulletin No. 73
on GRAY Flying Scot
available
on request

The G. A. Gray Co. / Cincinnati / Ohio /

What makes the $30,660* GRAY a best seller?

The 30"—36"—42" GRAY Flying Scot can lick any planer its size, in price or performance. It packs more value per dollar than any planer ever built. It is perfectly constructed, down to the smallest component, exactly like every Gray machine. It will perform — precisely — for years. Carbide planing up to 300 ft. per minute makes it the world's highest production small planer. Optional features, like double cutting and a duplex table, increase its productivity — and your hourly profit. Over (38) have been purchased since first introduced in May 1960.

*Basic price of 30" x 6' Flying Scot one rail head, electric drive, and controls.

horizontal milling and boring machines / planers / milling planers

Melt

the Cost of Making Steel

with NATIONAL CARBON'S "Four-Point Program"

Steel men know: The heart of the electric furnace is the electrode. Upon it depends so much of the success of furnace operations. But an electrode's performance is based on more than its component materials alone. Electrodes must be *engineered* to meet particular and demanding production conditions . . . and backed up by the supplier's reputation, service and facilities. Let NATIONAL CARBON help you reduce production costs through its "Four-Point Program."

Point 1

75 years of research and production experience in carbon products have built maximum life into "National" electrodes . . . providing more tons of steel per pound of electrode . . . saving the industry millions of dollars in materials and down-time.

Point 2

An industry-wide training program covering electrodes and electric furnace practices . . . designed to provide highest product performance through better utilization of power . . . to reduce refractory maintenance.

Point 3

Advanced electrode packaging and special-device gondolas speed shipments when and where needed . . . to save inventory and storage space . . . to keep investment at the most economical level. National Carbon's pool-car program provides these advantages for customers remote from its plants.

Point 4

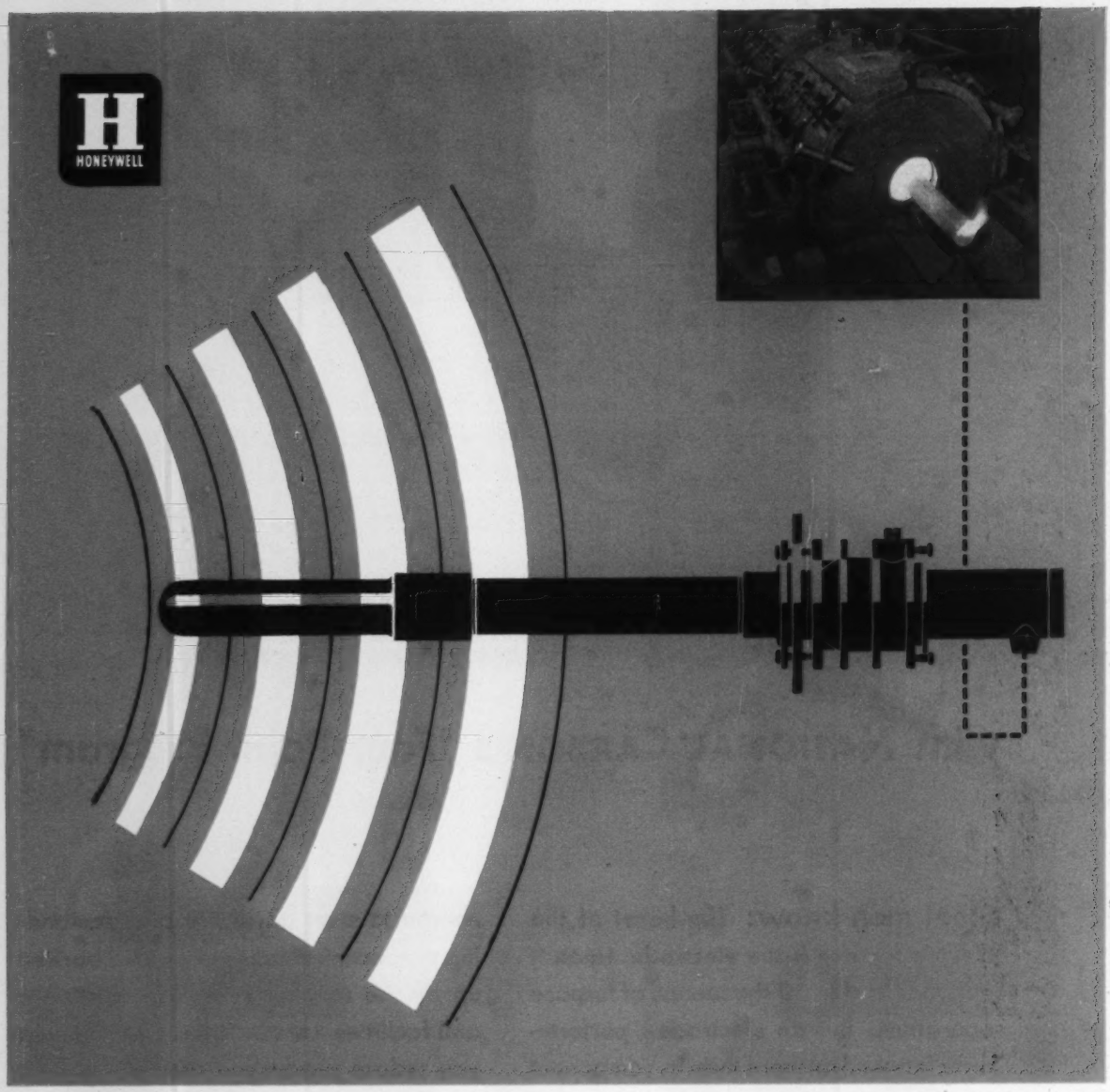
Unsurpassed raw material supplies and technical skills at strategically located plants minimize electrode costs.

"National" and "Union Carbide" are registered trade-marks for products of

NATIONAL CARBON COMPANY

Division of Union Carbide Corporation, 270 Park Ave., New York 17, N.Y.

UNION CARBIDE



Specify Radiamatic Infrared Detection Systems for dependable, economical temperature measurement and control

For more than 20 years, Radiamatic Infrared Systems have been giving reliable, accurate service in every area of industrial temperature measurement and control. Over the years, Honeywell has developed special infrared techniques and equipment for a wide range of applications, including soaking pits, kilns, heat treating, induction and forging furnaces.

The key to the high accuracy and low cost of these systems is the Radiamatic Infrared Detector. Available in many different models with a full line of accessories, these detectors measure temperatures from 200°F. up to 7000°F.

For complete information on how Radiamatic Infrared Systems can solve your temperature measurement and control problems, call your nearby Honeywell field engineer. Or write Minneapolis-Honeywell, Wayne and Windrim Aves., Philadelphia 44, Pa. In Canada, Honeywell Controls, Ltd., Toronto 17, Ontario.

Honeywell

First in Control

HONEYWELL INTERNATIONAL Sales and Service offices in all principal cities of the world. Manufacturing in United States, United Kingdom, Canada, Netherlands, Germany, France, Japan.

3M Abrasives Cut Costs of Steel Utensil Finishing

Nationally famous, "Ekcoware" cooking utensils are manufactured here in the housewares division of Ekco Products, Inc., Massillon, Ohio. Prior to color buffing, these copper-clad stainless steel pans are given a final polishing.

Abrasives Ekco formerly used for this final finishing required a considerable amount of "break-in" time and caused many pan rejects.

Now, thanks to a 3M Representative's suggestion, Ekco has switched to 3M "PG" Wheels. The results have been remarkable. "PG" wheels have upped production 20%, eliminated one handling operation, reduced rejects, and produced a better finish on the pans. There's no "break-in" period either, as 3M "PG" Wheels maintain an even cut from installation to throw-away point.

Why not let 3M's new COST CHECK 5-4-5 Program help you to effectively investigate ways to lower costs and increase production. Discover:

- If your grinding can be done more economically
- If your finishing is as efficient as possible
- If your polishing can be done faster and better

Send today for a free COST CHECK 5-4-5 Review Form without obligation. Put 3M's years of abrasive know-how at your disposal.

3M Coated Abrasives

SEND IN TODAY

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900 Bush Avenue
St. Paul 6, Minn.
Send me my free COST CHECK 5-4-5 Kit.

COST CHECK 5-4-5

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MINNESOTA MINING AND MANUFACTURING COMPANY

...WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

"3M" AND "PG" ARE REGISTERED TRADEMARKS OF 3M CO., ST. PAUL 6, MINN. EXPORT: 99 PARK AVE., NEW YORK 16. CANADA: LONDON, ONTARIO

NEW! OILITE® CYLINDER LINERS

- **Eliminate machining costs . . . reduce ring wear . . . cut oil consumption 66⅔%.**
- **Approved by leading manufacturers of both 2 cycle and 4 cycle engines after numerous 500 hour, full throttle tests.**

OILITE CYLINDER LINERS represent 3½ years of intensive engineering development work by the Amplex Division, Chrysler Corporation. The final break-through came less than a year ago with the successful formation of a new OILITE alloy (W-982). Now, thousands of test hours later, three conclusive facts are clear:

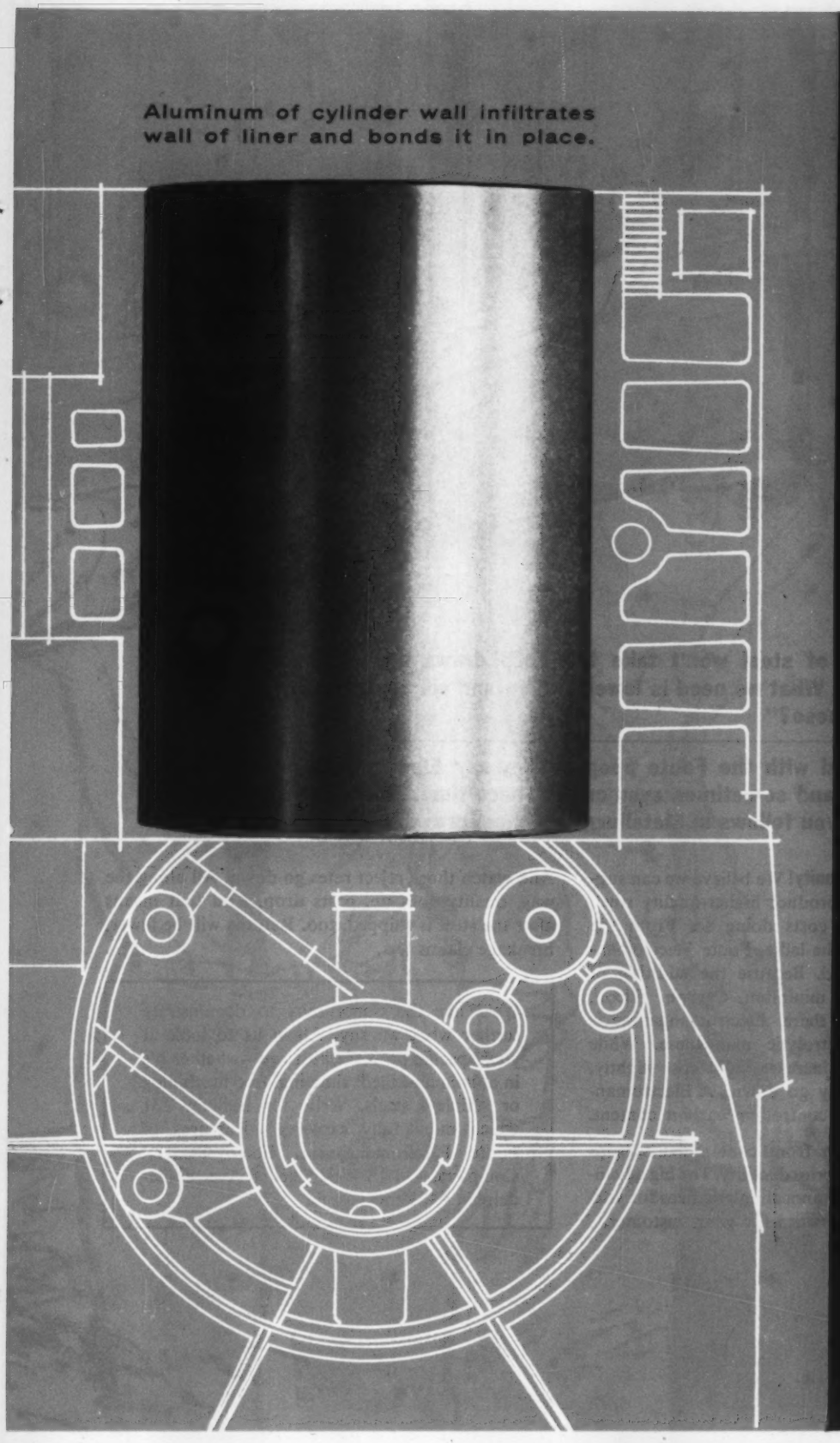
1. **OILITE CYLINDER LINERS** reduce oil consumption by as much as 66⅔%—and contribute to longer engine life.
2. **OILITE CYLINDER LINERS** reduce piston ring wear dramatically. For example, after a 500 hour test at full throttle, the machining marks on the rings are still clearly visible.
3. **OILITE CYLINDER LINERS** are produced as a precision part that may require only honing; therefore, a significant saving can usually be realized—especially in smaller horsepower range engines.

If you manufacture any type of internal combustion engine it will pay you to investigate OILITE CYLINDER LINERS immediately.

Reg. Trade Mark

AMPLEX
DIVISION CHRYSLER CORPORATION, DETROIT 31, MICH.

A CHRYSLER OILITE PRODUCT



CHIEF ENGINEER OF A LEADING MANUFACTURER SAYS:

"Oilite cylinder liners reduce our cost. But even if they did not, we'd use them because of the way they reduce ring wear and oil consumption and give us a better product."

"Jerry, this grade of steel won't take the deep draws our customers demand these days. What we need is lower carbon and silicon levels. Ever used Electromanganese?"

"No, but I've talked with the Foote people. They say Electromanganese improves ductility, and sometimes even cuts furnace time. This is hard to believe. Why don't you fellows in Metallurgy let them prove it?"

We'd welcome the opportunity! We believe we can suggest ways to help you produce higher-quality steel, and perhaps even cut costs doing so. From the moment you add it to the ladle, Foote Electromanganese® puts you ahead. Because the addition of impurities is held to a minimum. Carbon, silicon, phosphorus are barely there. Electromanganese is pure—99.9% pure electrolytic manganese. While Electromanganese may increase ingot cost slightly, actual furnace time may go down . . . Electromanganese lends a hand by controlling carbon content.

Almost perfect freedom from contaminants helps quality, starting with superior ductility. The big advantages here are improved annealing practices for you, better drawing characteristics for your customer.

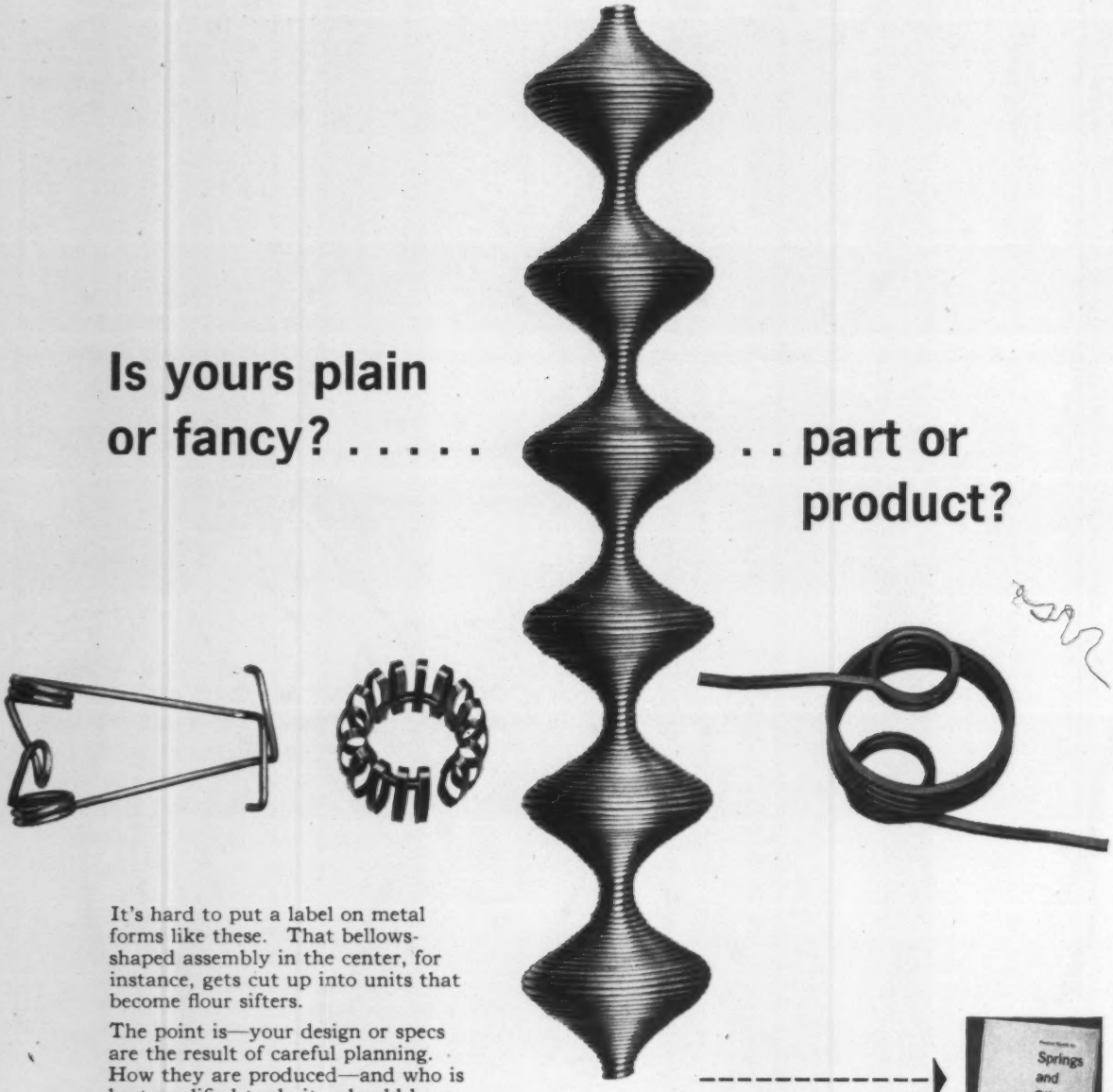
And watch those reject rates go down. All along the way, quality goes up, costs drop. And that means after the steel is shipped, too. Returns will be fewer, breakage claims less.

We'd like the opportunity to demonstrate further what we say. Allow us to look at your specific problem with you—whether it's in aluminum-killed, rimming, free-machining or stainless steels. Write for Bulletin 201 which more fully explores advantages of Foote Electromanganese. Foote Mineral Company, 438-18 West Chelten Ave., Philadelphia 44, Pennsylvania .

FOOTE
MINERAL COMPANY

C. S.

Is yours plain or fancy? . . . . part or product?



It's hard to put a label on metal forms like these. That bellows-shaped assembly in the center, for instance, gets cut up into units that become flour sifters.

The point is—your design or specs are the result of careful planning. How they are produced—and who is best qualified to do it—should have the same careful consideration.

As these custom-produced parts show, A.S.C. Divisions have the ability—and agility—to meet complex or simple requirements. Try them.

For detailed information about who we are and what we make, write for "Pocket Guide to Springs and Other Things."

6199

Associated Spring Corporation

General Offices: Bristol, Connecticut

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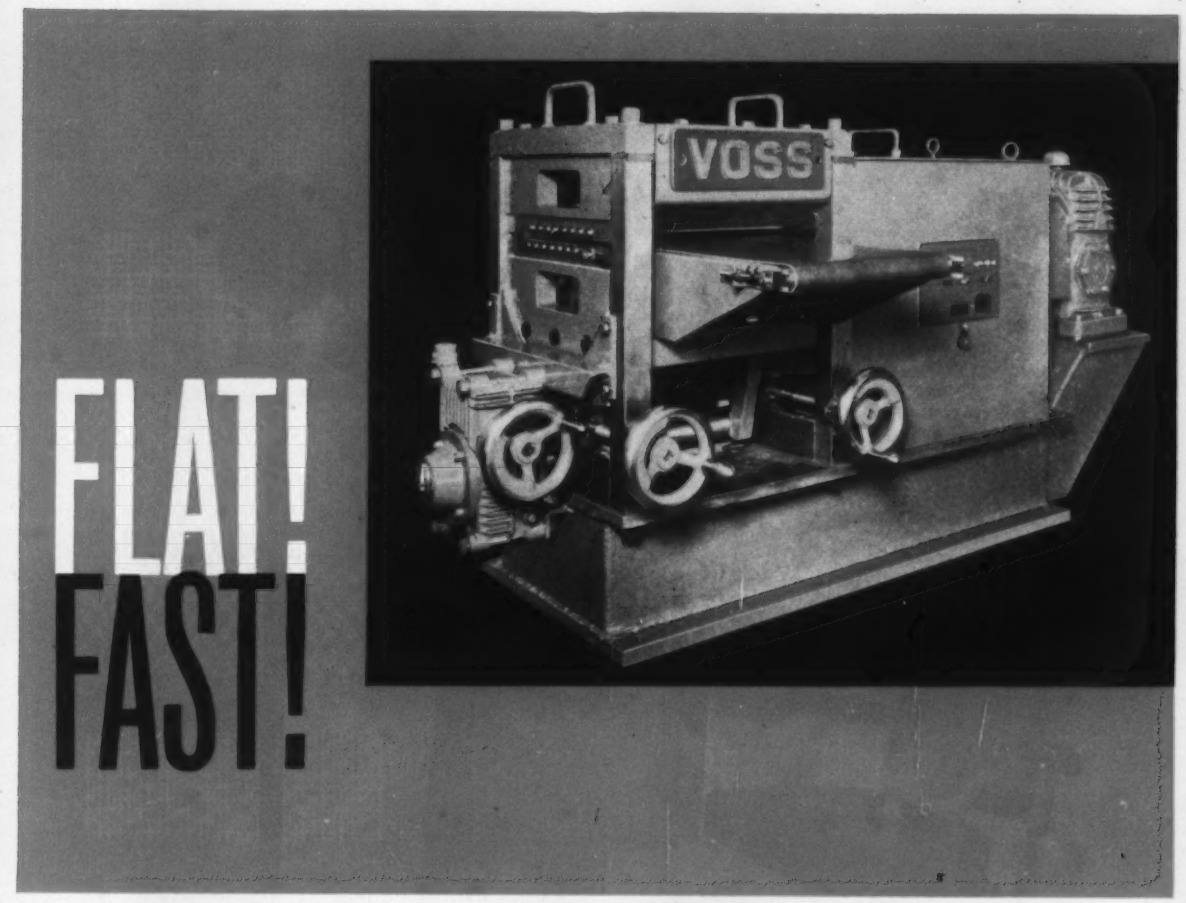


THAT'S THE STORY OF THE NEW VOSS STAMPED PARTS-FLATTENER

Stamped parts are flattened to .005 of dead flatness *in one pass!* Hand or automatic feed. Heavy duty, low maintenance. Takes no more space than your desk. Can be engineered to flatten parts with irregular surfaces. Savings in time and manpower can be enormous. Low cost for the job it does. If you're looking for cost reduction in your stamped parts operation, call or write Voss Engineering Company.

We'll be glad to arrange a demonstration with your parts, without obligation.

Voss ENGINEERING CO.

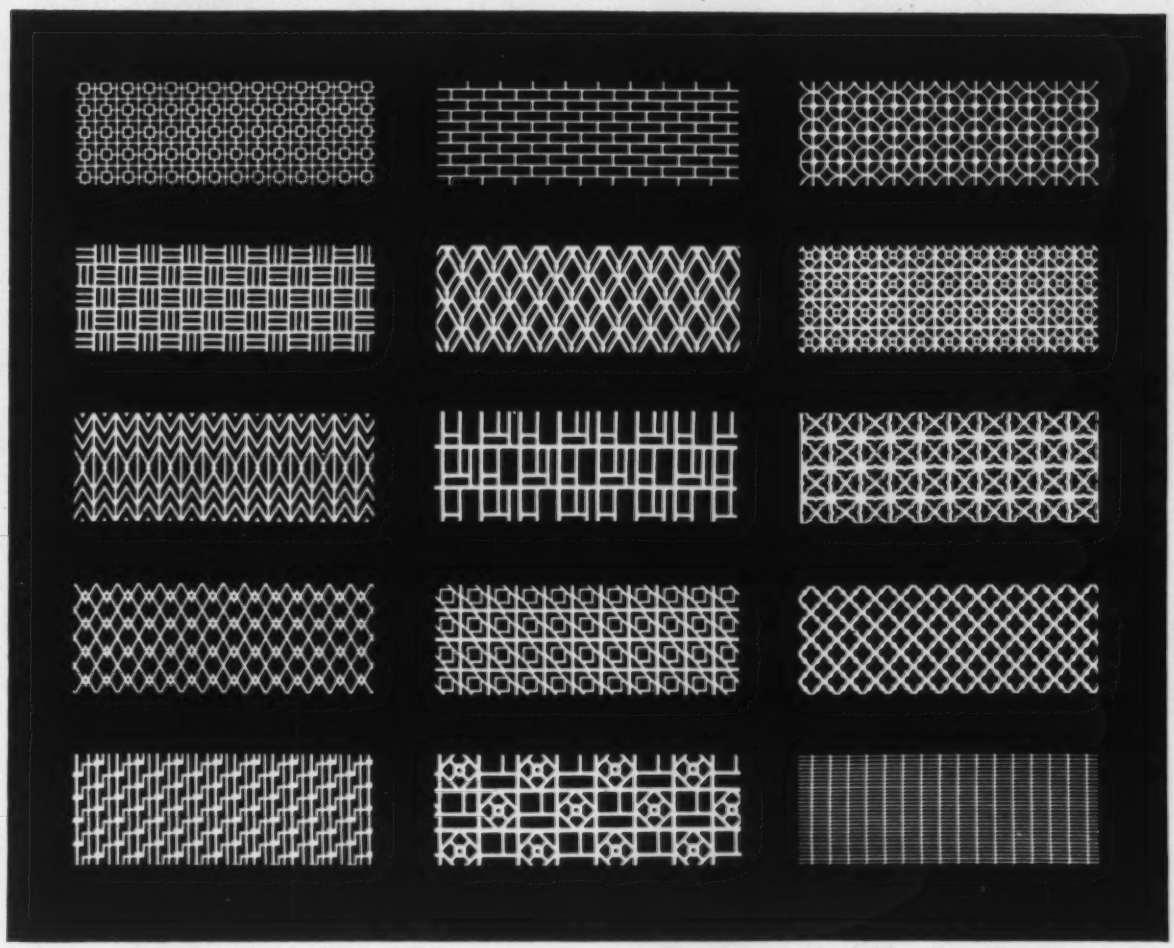
7301 Penn Ave. Pittsburgh 8, Pa. Churchill 2-4422

(Makers of the Voss Precision Roller Leveler)

Here's a man who's ready to help you with a roll problem

But you don't need to have a roll problem to have a visit from Bill Curran, General Manager at National Roll. To the contrary, the "boss" spends a lot of his time with customers discussing their operations and roll requirements before problems have an opportunity to develop. This is typical of the personal interest National takes in helping customers get the benefits of maximum roll performance. For personal attention to *your* roll requirements, whether steel, iron or nodular iron, order from National. You'll see why . . . NATIONAL'S THE GROWING NAME IN ROLLS.

NATIONAL ROLL & FOUNDRY DIVISION
GENERAL STEEL INDUSTRIES, INC., Avonmore, Pennsylvania
General Steel Industries, Inc., General Offices: Granite City, Ill. Plants: Granite City, Ill., Eddystone, Pa., Avonmore, Pa.
Subsidiary: St. Louis Car Company, St. Louis, Mo.



Why Metalworkers Work With Hendrick Perforated Metal

For well over 80 years the metalworking industry has relied on Hendrick for its perforated metal requirements. And with good reason! Hendrick perforated metal combines decorative beauty with the functional strength so often called for on new product specifications. Hendrick's vast stock of dies includes over 100 unusual patterns that are exclusive and only obtainable from the Hendrick Manufacturing Company.

Hendrick perforated plate is available in every type of commercially rolled metal in gauges and sizes of perforations to meet your exact specifications. For more information call your nearby Hendrick sales office. It's listed in your classified telephone directory under Metals, Perforated. Or —for FREE booklet, mail the coupon, today.

HENDRICK Manufacturing Company
37 Dundaff Street, Carbondale, Pennsylvania

Gentlemen: ☐ Please send me FREE booklet.
☐ Have representative call.

Name_____
Title_____
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Street_____
City_____ State_____

Perforated Metal • Perforated Metal Screens • Wedge Slot Screens • Hendrick Wedge Wire Screens • Architectural Grilles
Mitco Open Steel Flooring • Shur-Site Treads • Armorgrids • Hydro Dehazers • Distillation Column Internals

Your productivity is his business

This man specializes in cutting seconds from the time it takes to insert a screw or tighten a nut on the modern assembly line. He knows that bits of time and money saved—multiplied by production volume—result in increased productivity.

He's the Gardner-Denver Application Specialist—a good right hand to tool engineers and methods engineers. He starts with a single air motor, for example, and using a variety of handles, reduction gears, clutches and attachments as "building blocks," he assembles any one of 1173 specific air tools. Each Gardner-Denver air tool—screw driver, nut setter, drill or wrench—is engineered to solve a specific production problem for you. Call your Gardner-Denver Air Tool Specialist for a survey of your production lines. Remember: your productivity is his business.

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER-DENVER

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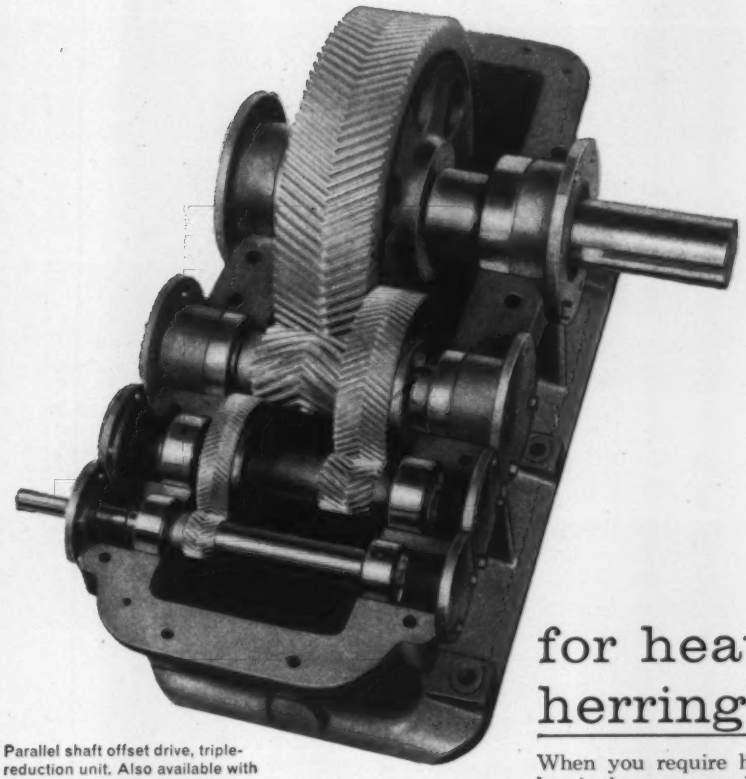
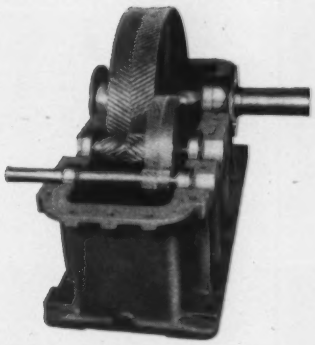
In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Ave., Toronto 16, Ontario
International: Gardner-Denver International Division, 233 Broadway, New York 7, N.Y.
International Offices: Buenos Aires, Argentina; Artarmon, N.S.W. Australia; Brussels, Belgium; Rio de Janeiro, Brazil; Santiago, Chile; Barranquilla, Columbia; Lima, Peru; Ndola, N. Rhodesia; Salisbury, S. Rhodesia; Johannesburg, Transvaal



Parallel shaft offset drive, triple-reduction unit. Also available with in-line drive design.

Parallel shaft offset drive, double reduction.



for heavy loads, use herringbone reducers

When you require heavy-duty drive units, D. O. James herringbone gear reducers provide unequaled advantages:

Strongest tooth form — due to the arch-like construction of the tooth and large 30° helix angle.

Greatest load-carrying capacity — large multiple-tooth contact in plane of action — full width of the tooth face is utilized.

No side thrust — thrusts of the opposing helices tend to balance each other, distributing load evenly across the face of tooth. Housing is economical because no provision for side thrust need be made, nor are thrust bearings required.

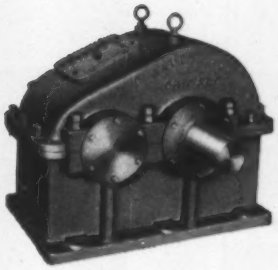
Improved splash lubrication — an oil film is formed and preserved by the wedging action of the teeth.

High efficiency — 98% on single reduction units.

These reducers are made in 110 standard sizes, single, double, and triple reduction, 2:1 to 370:1 ratios, .5 to 5000 hp.

For complete information, call your D. O. James representative or write today. Ask for Catalog 40-E.

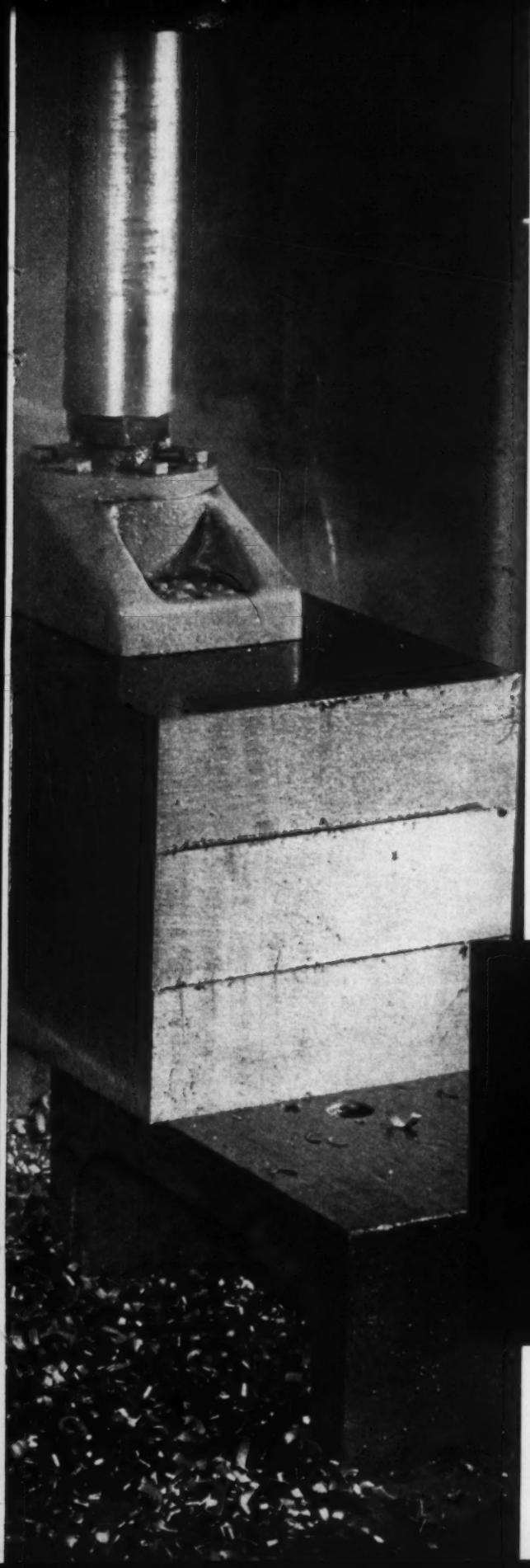
Parallel shaft offset drive, single reduction.



D. O. JAMES GEAR MANUFACTURING CO. 261
1140 West Monroe Street, Chicago 7, Illinois
Since 1888, every type of cut gear and gear reducer

D.O.James

...where you always get good gearing



ONLY J&L MAKES COLD FINISHED WIDE FLATS THAT ARE "MACHINE-SHOP PERFECT"

BECAUSE ONLY J&L COLD ROLLS FIRST, THEN DUPLEX MILLS THE EDGES.

J&L cold finished wide flats (six inches and up) are cold rolled and leveled—*then* the edges are duplex milled. Result? Wide flats with precise and uniform tolerances from bar to bar. Edges that are perfectly square and true.

Only J&L produces tool-and-die quality, "machine-shop perfect" wide flats. Operators depend on them for stripper and bed plates, dies, jigs, fixtures and machine cams that are accurate and uniform, require less machining.

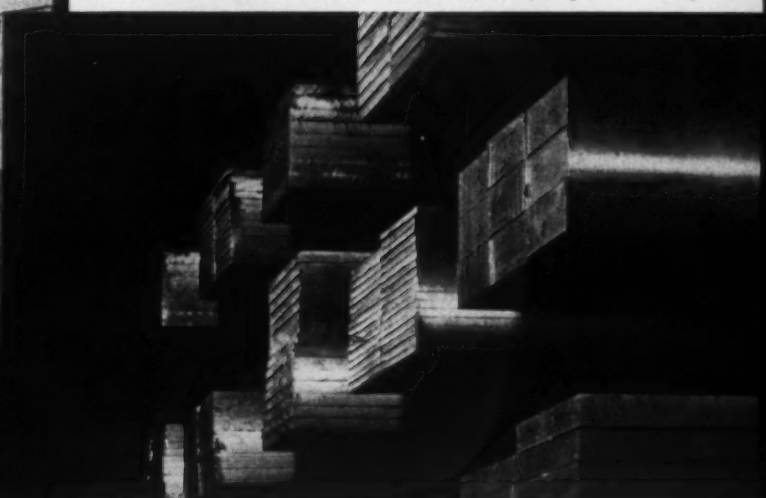
These prepared, machined flats are readily available from your local Steel Service Center in widths up to 14⅝" and in thicknesses from ⅛" to 2½".

Jones & Laughlin Steel Corporation

3 GATEWAY CENTER, PITTSBURGH 30, PENNSYLVANIA

Where cold finished steel bars originated in 1859

Your Steel Service Center stocks J&L Wide Flats as standard items for quick delivery.



J&L Wide Flats are duplex milled after rolling to give you uniformly square edges that reduce or eliminate further machining.

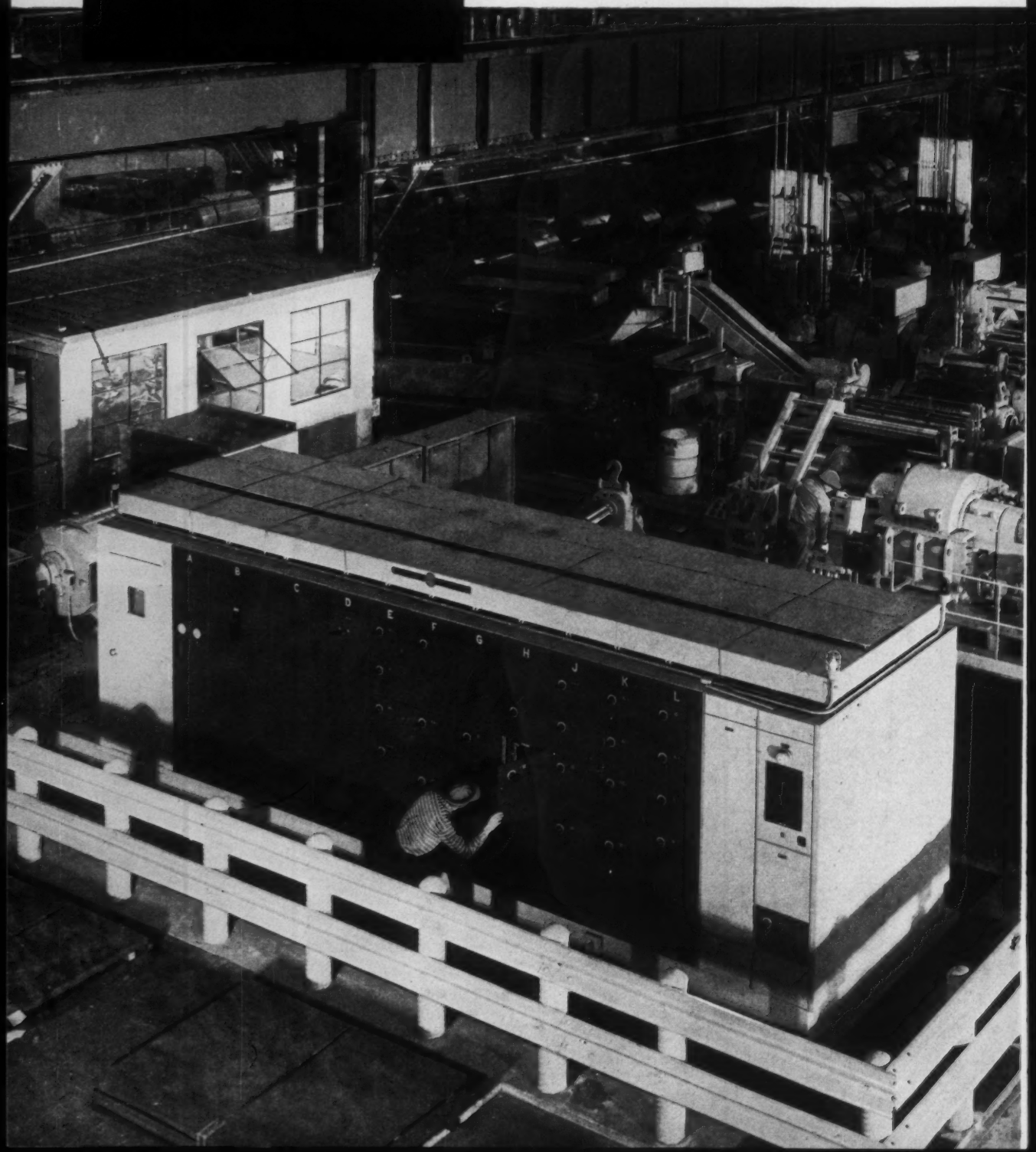
Steel

Steel's Symbol of strength, long life, and economy.

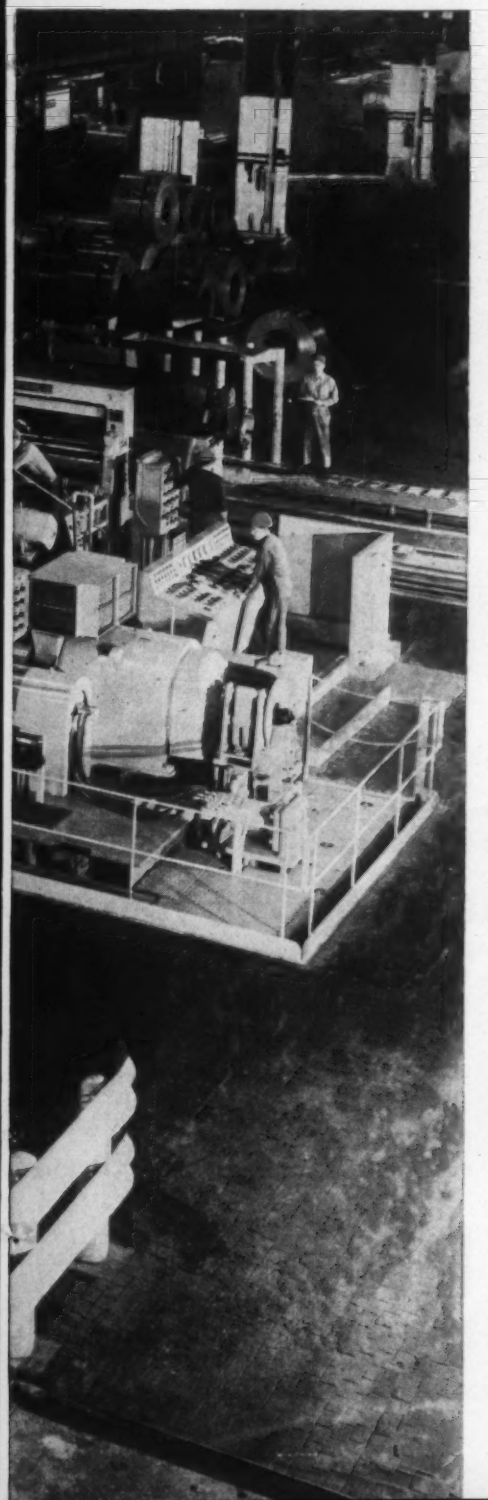
FOR QUALITY... PRODUCTIVITY ... PROFIT

STEEL MILL CONTROL
AUTOMATED BY GENERAL ELECTRIC

Cut $100,000 or more speed start-up date



from installed cost of mill power supply, with General Electric power-control room



It's a fact! A General Electric power-control room can save you $100,000 or more in total installed cost of mill power supply, and will cut weeks from the start-up time.

This modern, custom-built unit—for control of rolling and processing lines—groups all power-supply equipment into a compact, pre-engineered, self-supporting structure, which is completely factory wired and tested. Power conversion, control, ventilation, and other equipments are not scattered around the mill . . . eliminating the need for expensive cable systems. Actually, $100,000 is a conservative estimate of savings. In some cases, savings in cable alone total that much. Other big savings can come from elimination of separate motor room (up to $12,000), separate ventilation system (as high as $20,000), special foundations (up to $7,000), and major check-out and tune-up (can cost more than $5,000).

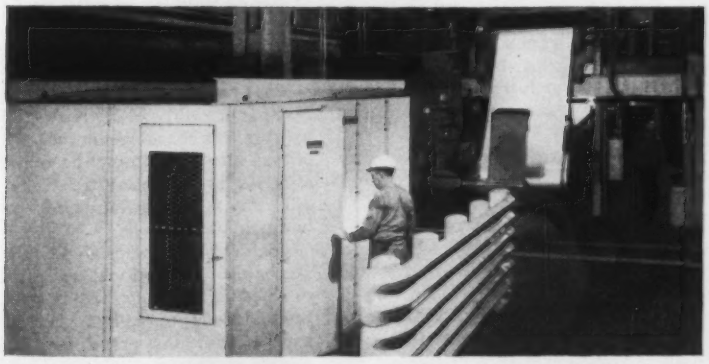
Preparation for start-up, which takes weeks with conventional equipment, can be completed in days with a G-E power-control room. Because General Electric supplies engineering drawings immediately after design is finished, you can make many necessary preparations in advance of delivery. With all inter-control wiring and system testing completed before shipment, you need make only final connections and tune-up prior to operation. Faster start-up means your mill investment is producing salable output sooner.

Seventy-five years of experience in developing and building control equipment and systems for the steel industry stand behind General Electric's power-control room. Include a G-E power-control room in your modernization plans. And, call on General Electric for all process control. See your G-E sales representative, or write Section 785-17, General Electric Co., Schenectady 5, N. Y.

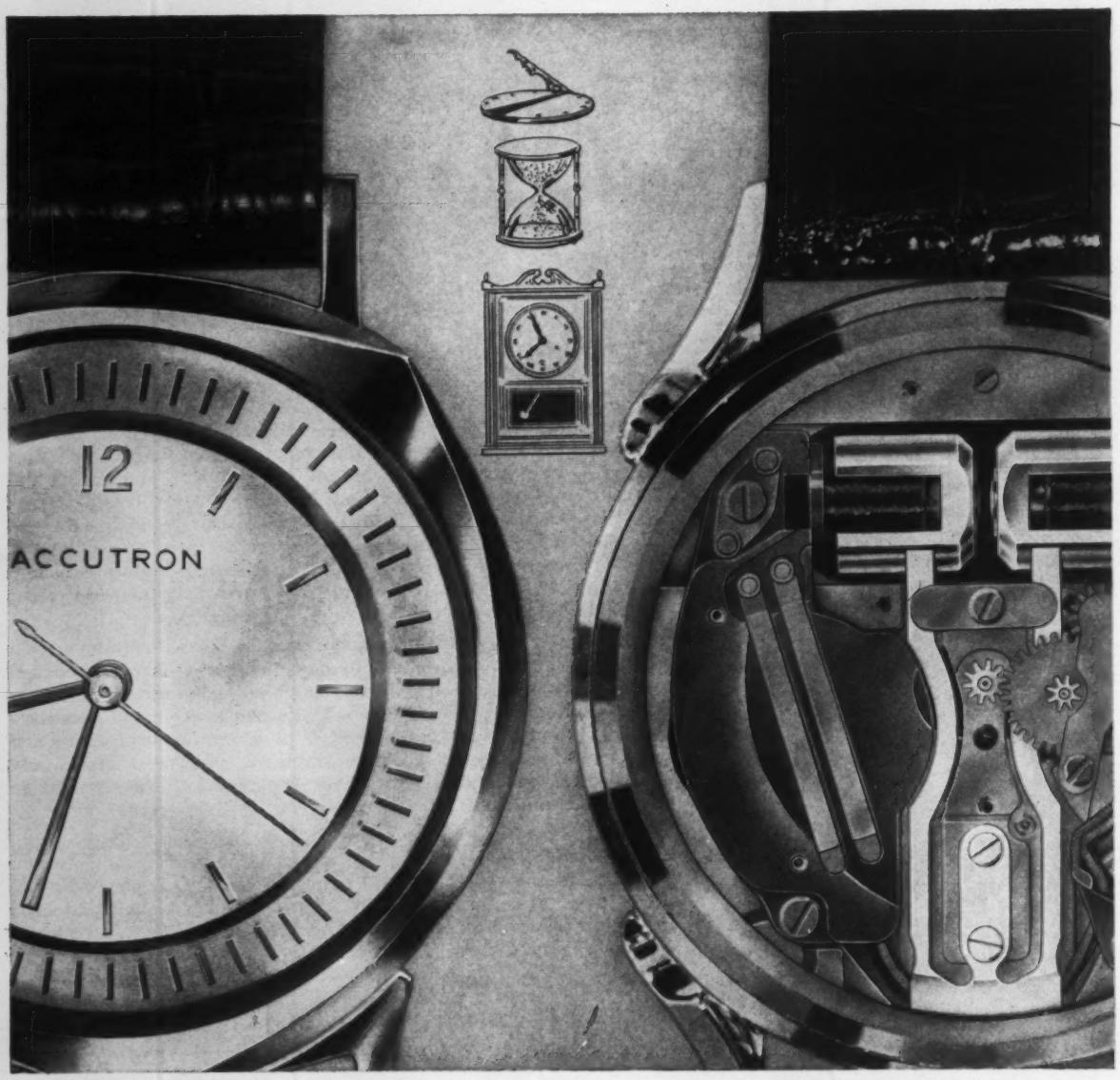
Industry Control Department, Salem, Virginia.

Progress Is Our Most Important Product

GENERAL ELECTRIC



A POWER-CONTROL ROOM, such as the above at Armco Steel's Butler, Pa. Works, can reduce space requirements up to 50 percent. Put it in the best location—right beside the mill or in previously unusable space.



How Nickel helps make timekeeping history

Electronic tuning fork made of a Nickel alloy represents the most basic advance in personal timekeeping in 300 years

A watch you don't need to wind. A watch without mainspring, balance wheel, or hairspring. A watch that doesn't gain or lose more than 2 seconds out of every 86,400!

The secret of the fantastic timekeeping accuracy of Accutron* is a precision tuning fork that vibrates more than 31 million times every twenty-four hours—day after day, week after week, month after month... powered by a button-size battery.

To assure the faultless, electronic measurement of time, the tuning fork's incessant vibration must remain constant under a wide range of temperatures and all sorts of shock and impact that can occur in day-to-day watch wear.

That's why electronic engineers chose Ni-Span-C† alloy (42% Nickel) for the heart of this space-age marvel. This high Nickel alloy maintains the fork's vital stiffness at temperatures from 0° to 150° F... fights off damaging corrosion and oxidation.

Just as Nickel helps give this watch's mechanism exceptional reliability, so too Nickel can increase the reliability of hundreds of alloys under many severe conditions—great heat, cold, corrosion, or stress. Alone, or with other elements, Nickel gives alloys the combination of properties to meet the most demanding metals needs.

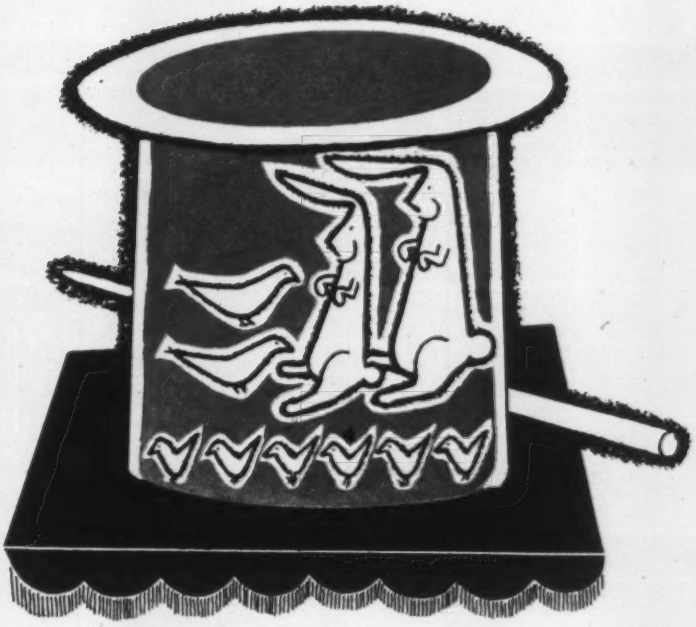
Perhaps Nickel or a Nickel alloy can help solve your metal problem. To find out, just write to Inco.

*Bulova Watch Company, Inc. trademark.
†Registered trademark, Inco.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York 5, N. Y.

INCO NICKEL

MAKES ALLOYS PERFORM BETTER LONGER



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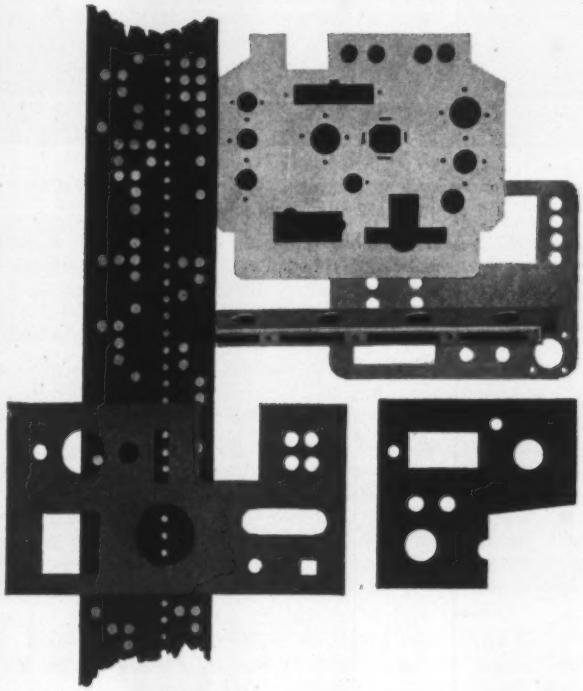


A spoken command, a wave of a wand. And—before your very eyes—a magician plucks from his hat rabbits, pigeons or chicks—one, two, or six of a kind. The *right equipment* is the key to his magic.

For metal fabricators, the WIEDEMANN is the *right equipment* to pierce plates and panels on a short run and medium production lot basis. A WIEDEMANN makes possible the production of 1-10-100-1000 or more parts—economically, accurately and efficiently—with a minimum of preparation.

Turrets carry all punches and dies ready for immediate use. Work is positioned mechanically to rapidly and accurately locate and pierce holes of many sizes and shapes. This combination eliminates layout, setup, handling, expensive tools and most costly factors which are necessary in other methods.

The new WIEDEMATIC is the latest and most efficient WIEDEMANN turret punch press. This machine is designed specifically for highspeed short and medium run production. Tool selection, work positioning and piercing are fully tape-controlled. Engineering changes, too, are readily made by simply substituting desired information on the tape.

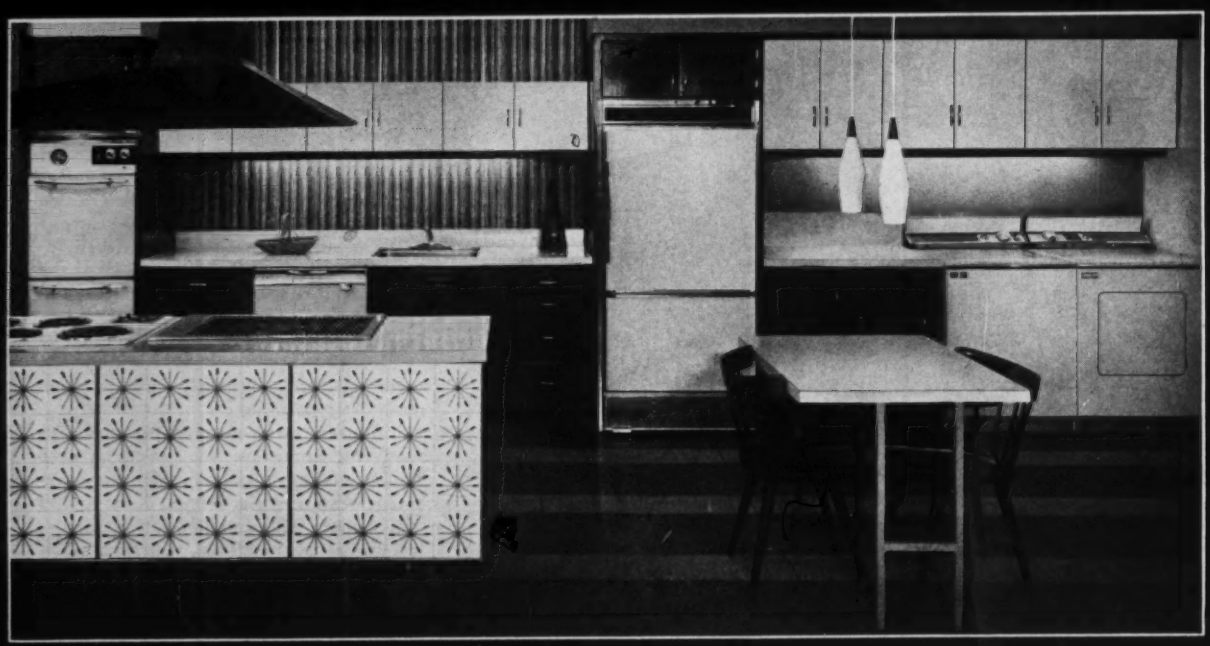
In metal fabrication, a WIEDEMANN is your magician's hat. And—because of it—you realize substantial savings unheard of with other machines in the field. Write today for complete information on how a WIEDEMANN will make money for you. Include drawings for time study and recommendations for the *right equipment.*

From the versatile 150 ton R-15 down to the hand operated R-2, there's a Wiedemann for your short run piercing requirements.

WIEDEMANN

WIEDEMANN MACHINE COMPANY

Dept. IA-9, Gulph Road • King of Prussia, Pa.



SEE HOW MANY MODERN THINGS THESE STEELS CAN DO FOR YOUR APPLIANCES

When you choose steel for your kitchen appliance line, yours is a product that's all things to all customers—whether they're quality-minded, budget-minded or beauty-minded. In fact, about the only thing that can equal steel's sales appeal is its advantage, economically, to you. Case in point: the modern steels of Weirton Steel Company.

TAKE WEIRKOTE®, FOR INSTANCE—and dispense with the extra costs of anti-corrosion coating operations. Weirkote galvanized steel offers you heavy-duty corrosion resistance, economical flake-free, peel-free fabrication and an advantageously low expansion-contraction rate. The latter gives Weirkote a vital edge over lighter metals—namely, an edge that stays put at the seams, despite the temperature changes that occur in stoves, freezers, refrigerators, washers and dryers. (Weirkote is also available from National Steel's Midwest Steel division.)

OR TAKE WEIRZIN®—an electrolytically zinc-coated steel with excellent corrosion resistance and, when chemically treated, superb paintability. These advantages, plus Weirzin's economical, flawless fabrication, make it an ideal choice for strong, durable, good looking kitchen cabinets.

OR WEIRTON COLD-ROLLED STEEL—to give you a fine, smooth finish and unexcelled ability to withstand the severe forming operations necessary for intricate designs.

OR PRE-PAINTED OR VINYL-COATED WEIRTON STEELS—Factory pre-painting of Weirkote and Weirzin or cold-rolled steel offers you built-in economy, controlled quality and any shade you might want. Vinyl coating, done by National Steel's Enamelstrip Division of Allentown, Pennsylvania, can be ordered in almost any texture and color. Any Weirton Steel goes through all production steps flawlessly and economically.

TAKE MODERN STEEL—particularly in any of the forms mentioned above. For full details, write Weirton Steel Company, Weirton, West Virginia.

WEIRTON STEEL
Weirton, West Virginia

A division of **NATIONAL STEEL CORPORATION**

USE THESE IDEAS...

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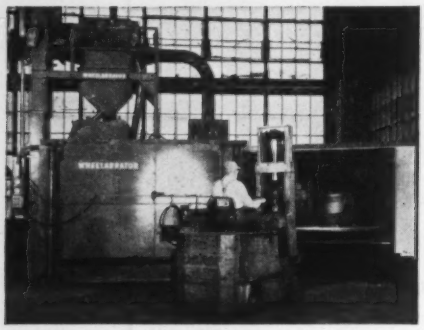
Out of the Texaco man's briefcase comes a wealth of ideas for cost control through organized lubrication—Texaco's "Stop Loss" Program. Managers in many industries are already using these plans to reduce losses in three important areas: production, maintenance and purchasing. Their savings go directly into profits—the average is a 4% gain in their net. Get the facts. Write for our informative folder: "How to Starve a Scrap Pile." **TEXACO** INC., 135 East 42nd Street, New York 17, N. Y. Dept. IA-191

TEXACO

A demonstration of WHEELABRATOR'S

VITAL VALUES



Double-door Swing Table permits full-time cleaning operation. One load is being cleaned in the cabinet, while lift truck positions second load on alternate door.

Wheelabrator swing table **cleans** giant castings in one-sixth former time

Improved quality of cleaning and decreased cleaning time were immediate results of the replacement of an old airblast room with a 96" Wheelabrator Swing Table at a Michigan production plant for removing sand and annealing scale from castings weighing up to 10,000 lbs. each. The tremendous abrasive barrage from the two high-capacity Wheelabrator units combined with the ease of handling provided with the double work tables are reflected in greatly improved cleaning speed. In one case, pieces which formerly required several hours in the airblast room are now Wheelabrator cleaned in just 15 minutes. This capacity for work is just one of the vital values Wheelabrator equipment delivers to cost-conscious users. Write for complete information.

VITAL VALUES FOR INDUSTRY

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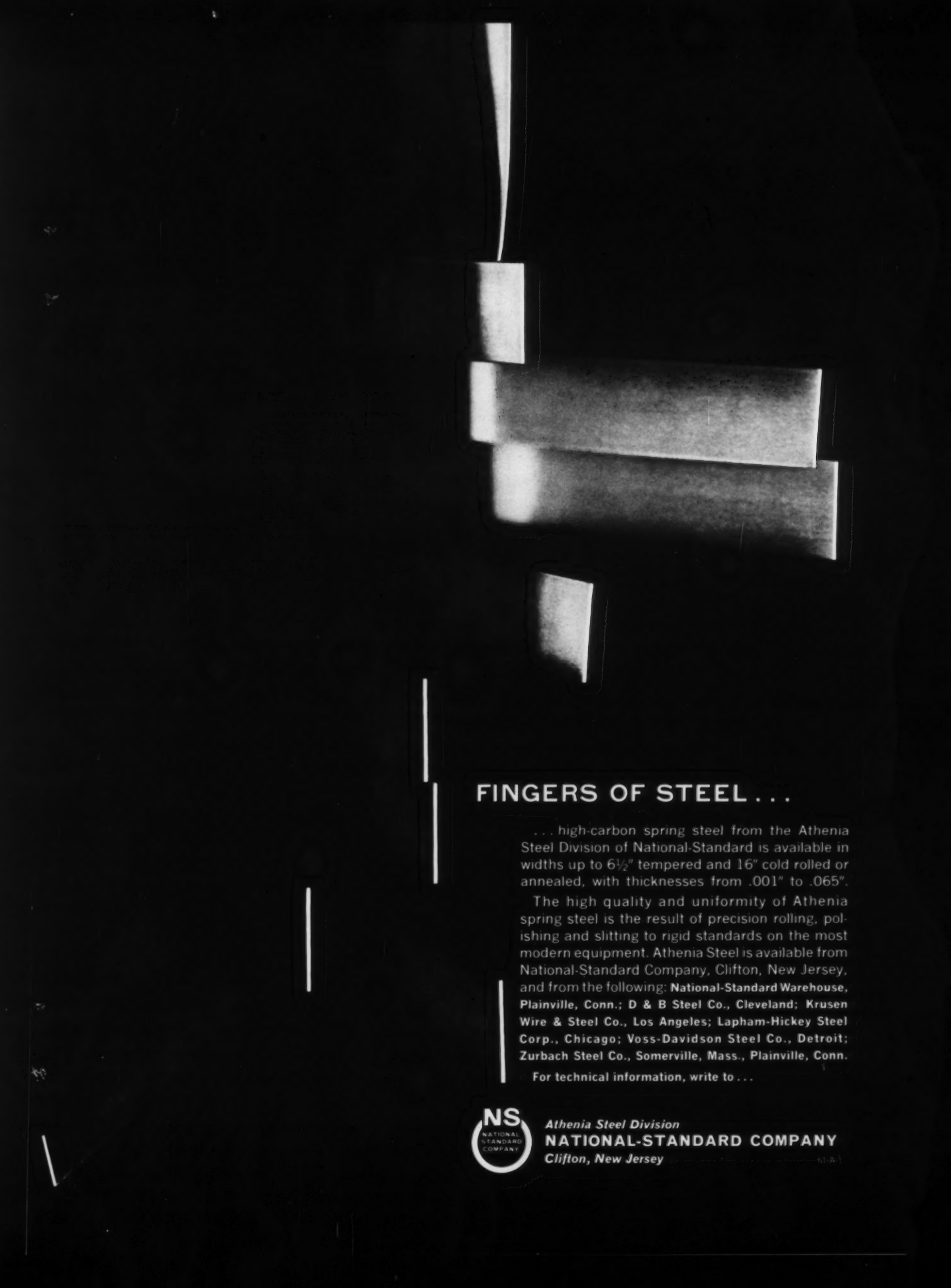
AIRLESS BLAST EQUIPMENT

WHEELABRATOR CORPORATION, 510 S. Byrkit St., Mishawaka, Indiana. In Canada, WHEELABRATOR CORPORATION OF CANADA, LTD. 1901 Birchmount Rd. P.O. Box 490, Scarborough, Ontario
A subsidiary of Bell Intercontinental Corp.



FINGERS OF STEEL . . .

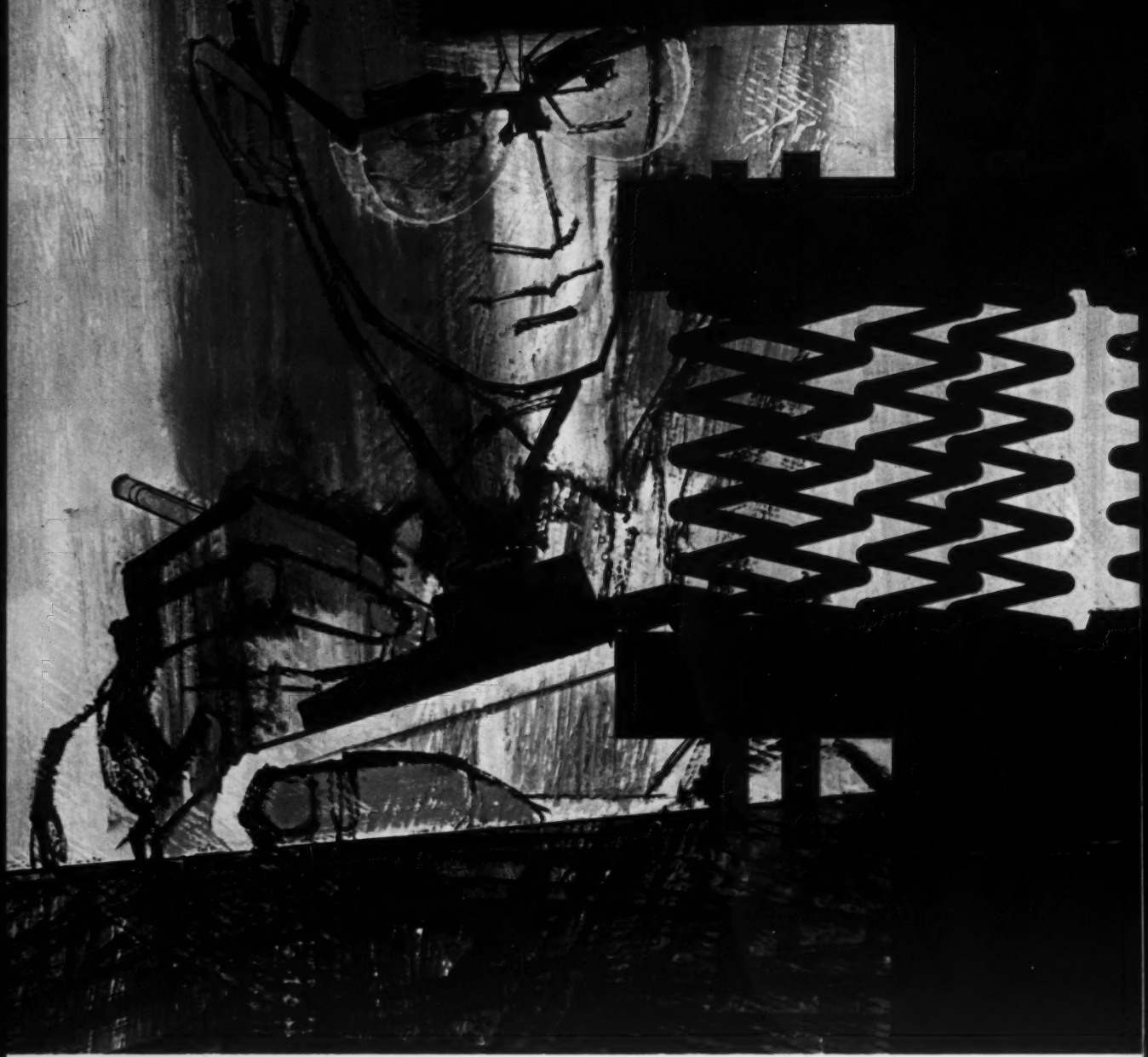
. . . high-carbon spring steel from the Athenia Steel Division of National-Standard is available in widths up to 6½" tempered and 16" cold rolled or annealed, with thicknesses from .001" to .065".

The high quality and uniformity of Athenia spring steel is the result of precision rolling, polishing and slitting to rigid standards on the most modern equipment. Athenia Steel is available from National-Standard Company, Clifton, New Jersey, and from the following: **National-Standard Warehouse, Plainville, Conn.; D & B Steel Co., Cleveland; Krusen Wire & Steel Co., Los Angeles; Lapham-Hickey Steel Corp., Chicago; Voss-Davidson Steel Co., Detroit; Zurbach Steel Co., Somerville, Mass., Plainville, Conn.**

For technical information, write to . . .

NS
NATIONAL STANDARD COMPANY

Athenia Steel Division
NATIONAL-STANDARD COMPANY
Clifton, New Jersey



New N-S stainless wire tests 100,000 psi

From National-Standard research and development comes NS-355—a stainless steel, corrosion resistant spring wire having much greater elasticity than conventional stainless steel wire.

NS-355 is a semi-austenitic alloy, originally developed for use in heavy wire sections fabricated from bar, billet or plate stock—applications requiring corrosion resistance, strength, durability and hardness. National-Standard searched for a way to apply these outstanding advantages to highly stressed spring wire applications.

After comprehensive research in processing methods, National-Standard metallurgists developed the capability to draw NS-355 alloy into exceptionally high-tensile spring wire. Spring production tests were made on .125 and .075 inch diameter wire samples with a tensile strength over 100,000 psi higher than music spring wire, proving that NS-355 wire could be satisfactorily run on automatic coiling machines with excellent formability.

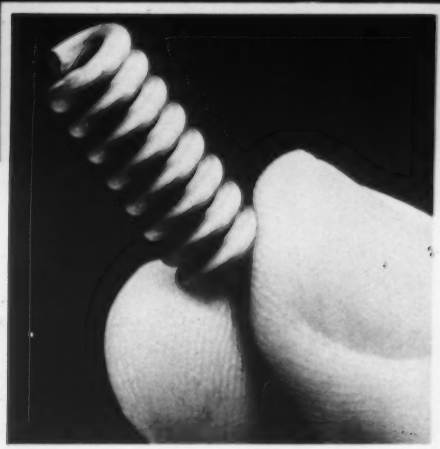
Further evaluation tests were conducted in the Spring Laboratory of Bendix Corporation, South Bend, Indiana. Here, engineers ran life cycle tests on NS-355 stainless steel springs and determined spring modulus values. On a mechanical cycling unit—eight springs to a fixture—NS-355 springs

above music wire

were subjected to 600 compression cycles per minute—a total of 10-million cycles under stresses from 20,000 to 150,000 pounds.

The development of NS-355 stainless steel spring wire creates an entirely new solution to highly stressed, corrosion resistant spring requirements for jet engines, food and beverage equipment, chemical machinery and a growing number of other special wire applications.

For more information about new NS-355 stainless steel spring wire, or help in developing high quality wire to meet your special or unique applications, write National-Standard Company, Niles, Mich.



National-Standard NS-355 stainless steel springs with an index as low as 3 can be formed on automatic coiling machines without breakage.

NS NATIONAL STANDARD COMPANY

Manufacturer of Specialty Wire & Metal Products

NATIONAL-STANDARD COMPANY

Niles, Michigan

61-W03

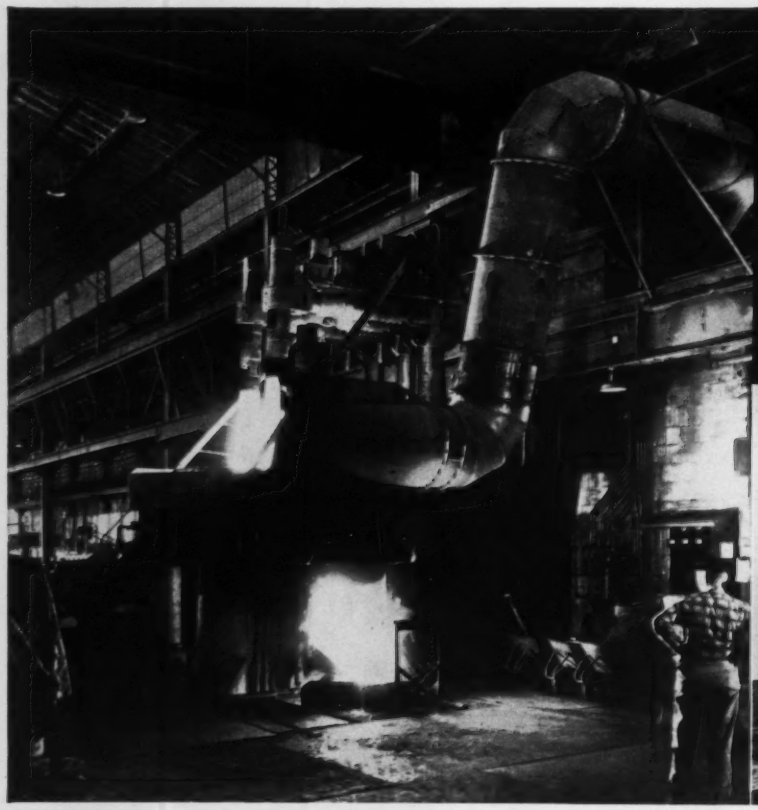
at The National Supply Division,
Armco Steel Corporation,
Torrance, California . . .

clean air from electric furnaces

■ The melting department of National Supply won a quick stamp of approval when they started collecting electric furnace fumes with a high-efficiency Dracco Multi-Bag Filter system. The system uses Dacron bags to clean hot gases and ventilation air coming from three arc furnaces. Capacity of the system is 75,000 cfm—enough to handle normal operating demands and provide a reserve to permit oxygen lancing of the melt. After four years of service, the system continues to meet the requirements of one of the nation's toughest air pollution codes, keeping furnace effluents free of visible particles.

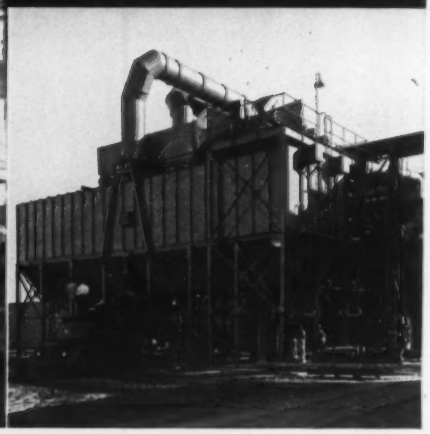
Collecting electric furnace fume is just one of the many capabilities of Dracco cloth filtration techniques. They have been successfully applied to a variety of fume and dust problems throughout the metals industry. If you have an air pollution problem, write Dracco for a cost-saving solution. Dracco Division of Fuller Company, Harvard Avenue and East 116th Street, Cleveland 5, Ohio.

Dracco Filter System labeled "best in the West" by Los Angeles air pollution control authorities



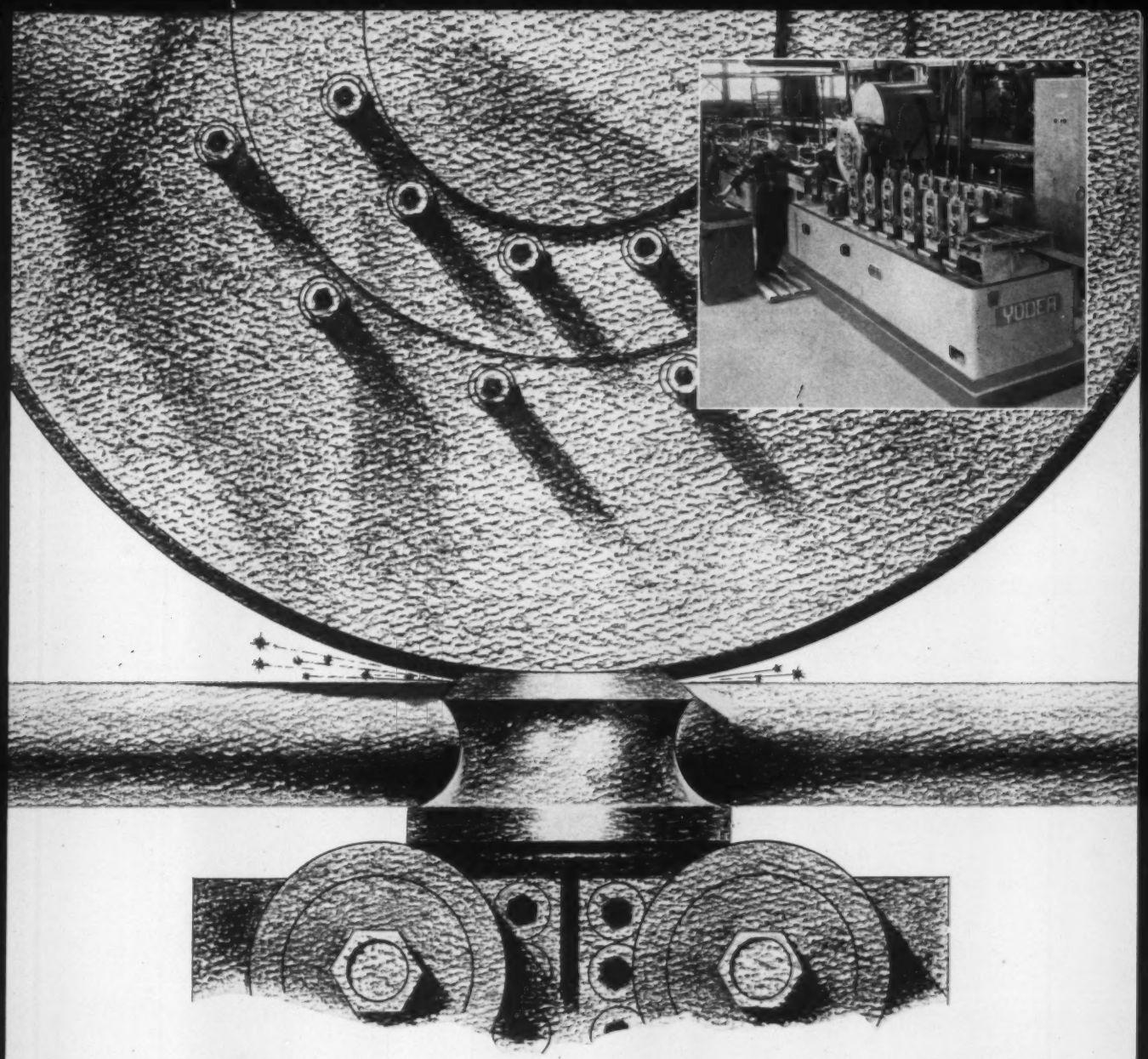
(Left) Roof-mounted hood and swivel-type duct connection collect fume from this 25-ton electric furnace during all phases of operation. Controls based on temperature automatically adjust rate of air flow in the system to the changing load.

(Below) Four-compartment Dracco Multi-Bag Filter handles up to 75,000 cfm at 225°F. All visible fume particles from three electric furnaces are collected by the unit's Dacron bags. Replacement of six filter bags is the only significant maintenance in four years of operation.



DRACCO *airstream* conveyors
dust control equipment

FULLER COMPANY GENERAL OFFICES



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"TYPE V" PIPE AND TUBE WELDER . . . VAPOR COOLED!

Thousands of hours of tests and actual production point up the major productivity increases achieved by the new Yoder "Type V" Welder. The new Welder is available as a replacement unit for existing equipment or as an original component of a new Yoder pipe or tube mill.

The advanced design and engineering of the Yoder "Type V" Welder is described in a new brochure. This valuable information can be yours by return mail. Send the coupon at the right . . . today!

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Gentlemen:

Please send me full details on the new Yoder "Type V" vapor-cooled pipe or tube welder.

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... by supplying aluminum cut to your size requirements, on special equipment, as you need it. Kaiser Aluminum Distributors are geared to reduce waste ... save space ... reduce your inventory cost. Give us a jingle.

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Earle M. Jorgensen Co.
OR 2-1621

INDIANAPOLIS, INDIANA
Chase Brass & Copper Co., Inc.
ME 7-1543
Hubbell Metals Inc.
ST 7-1341
F. H. Langsenkamp Co.
ME 6-4321

KANSAS CITY, MISSOURI
Chase Brass & Copper Co., Inc.
VI 2-1710
Hubbell Metals Inc.
BA 1-7760

LITTLE ROCK, ARKANSAS
Delta Metals, Inc.
LO 5-5536

LOS ANGELES METROPOLITAN AREA
Chase Brass & Copper Co., Inc.
RA 3-5351
Consolidated Metal Products of Calif., Inc.
658-6158
(services Mobile Home Market only)
Eureka Metals Supply Co.
MA 8-3161
Earle M. Jorgensen Co.
LO 7-1122
Reliance Steel & Aluminum Co.
LU 3-6111
U. S. Steel Supply Div.—
United States Steel Corp.
LU 5-0101

LOUISVILLE, KENTUCKY
Hubbell Metals Inc.
ME 7-2595

MEMPHIS, TENNESSEE
Hubbell Metals Inc.
WH 8-1661

MILWAUKEE, WISCONSIN
Chase Brass & Copper Co., Inc.
DI 2-7630
Fullerton Metals Co.
HU 1-6900
Lewis Steel & Aluminum Co., Inc.
EV 4-6000

MINNEAPOLIS-ST. PAUL METROPOLITAN AREA
Chase Brass & Copper Co., Inc.
FE 6-4661
Fullerton Metals Co.
ST 1-3456
Korhumel Steel & Aluminum Co.
FE 6-2661
U. S. Steel Supply Div.—
United States Steel Corp.
MI 6-7311

NEW YORK-NEWARK METROPOLITAN AREA
Chase Brass & Copper Co., Inc.
TW 4-0500
T. E. Conklin
Brass & Copper Co., Inc.
WA 5-7500
A. R. Purdy Co., Inc.
CH 3-4455
David Smith Steel Co., Inc.
GE 9-5600
U. S. Steel Supply Div.—
United States Steel Corp.
BA 7-7711

NEW ORLEANS, LOUISIANA
Chase Brass & Copper Co., Inc.
HU 6-5441

OCALA, FLORIDA
Consolidated Metal Products Inc.
MA 9-5059
(services Mobile Home Market only)

OMAHA, NEBRASKA
Gate City Steel Inc.
341-1830

PHOENIX, ARIZONA
Earle M. Jorgensen Co.
BR 2-0461
Reliance Steel & Aluminum Co.
AL 8-7145

PORTLAND, OREGON
Eagle Metals, Inc. of Oregon
AT 8-5201
U. S. Steel Supply Div.—
United States Steel Corp.
CA 2-3283

PHILADELPHIA, PENNSYLVANIA
Chase Brass & Copper Co., Inc.
BA 3-5800
Hill-Chase & Co., Inc.
PI 3-5400
U. S. Steel Supply Div.—
United States Steel Corp.
WA 5-7882

PITTSBURGH, PENNSYLVANIA
Chase Brass & Copper Co., Inc.
CE 1-7900
Wm. M. Orr Co., Inc.
CH 2-3000

PROVIDENCE METROPOLITAN AREA
Chase Brass & Copper Co., Inc.
DE 1-2300
Tower Iron Works, Inc.
SO 1-4900

RICHMOND, VIRGINIA
Hill-Chase Steel Co. of Virginia
359-6031

ROCHESTER, NEW YORK
Chase Brass & Copper Co., Inc.
HA 6-3959

SALT LAKE CITY, UTAH
Metals Supply Co. Inc.
EM 3-6726

SAN ANTONIO, TEXAS
Delta Metals, Inc.
CA 3-4248

SAN FRANCISCO-OAKLAND METROPOLITAN AREA
American Brass & Copper Co.
HI 4-2366
Chase Brass & Copper Co., Inc.
PL 6-4809
Earle M. Jorgensen Co.
HI 4-2030
U. S. Steel Supply Div.—
United States Steel Corp.
MA 1-4988

SEATTLE, WASHINGTON
Chase Brass & Copper Co., Inc.
MA 4-1862
Eagle Metals Co.
PA 3-9974
Earle M. Jorgensen Co.
MU 2-7910
U. S. Steel Supply Div.—
United States Steel Corp.
MA 3-3014

SPOKANE, WASHINGTON
Eagle Metals Co.
KE 4-0586

ST. LOUIS, MISSOURI
Chase Brass & Copper Co., Inc.
PR 6-3111
Hubbell Metals Inc.
FR 1-0212
U. S. Steel Supply Div.—
United States Steel Corp.
JE 5-0440

TAMPA, FLORIDA
Fullerton Metals Co.
4-6121

TOLEDO, OHIO
Art Iron & Wire Works, Inc.
CH 1-1261

TULSA, OKLAHOMA
Earle M. Jorgensen Co.
TE 5-1511

WATERBURY, CONNECTICUT
Chase Brass & Copper Co., Inc.
PL 6-9444

WICHITA, KANSAS
Earle M. Jorgensen Co.
LY 1-3425

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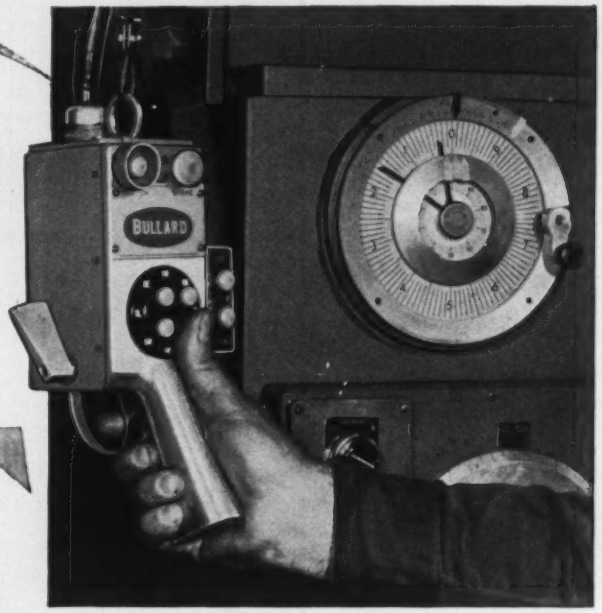
KAISER ALUMINUM*

*T.M. KAISER ALUMINUM & CHEMICAL CORP.

NEW LEADERSHIP IN THE WORLD OF ALUMINUM

Lower Costs – Increase Profits with

CENTRALIZED POWER CONTROL

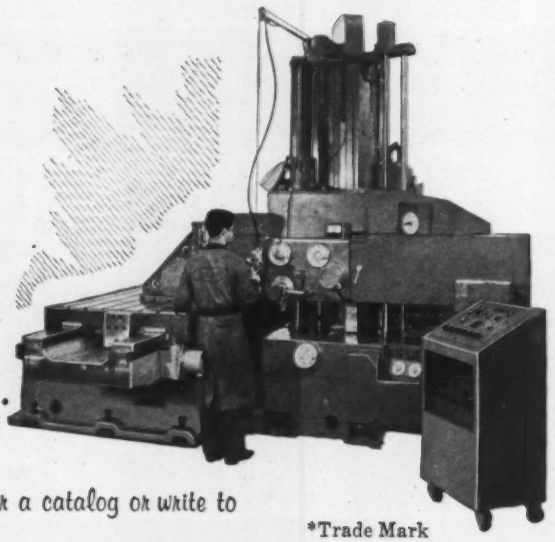


..... on the BULLARD DYNAMILL* H.B.M.

Large, easy to read clock-type dials allow the operator to "power" position the head, table, saddle and spindle in relation to the work piece without the use of hand cranks or levers. These dials, when the machine is equipped with numerical control, provide an accurate, instantaneous visual read-out on the positioning of the system.

Simple push buttons on the control pendant direct all motions of the head, table, saddle and spindle. Spindle start and stop, as well as spindle speed changes, are controlled from buttons on the pendant. Four traverse rates and feed engagement are actuated by the operator's forefinger on the pendant trigger.

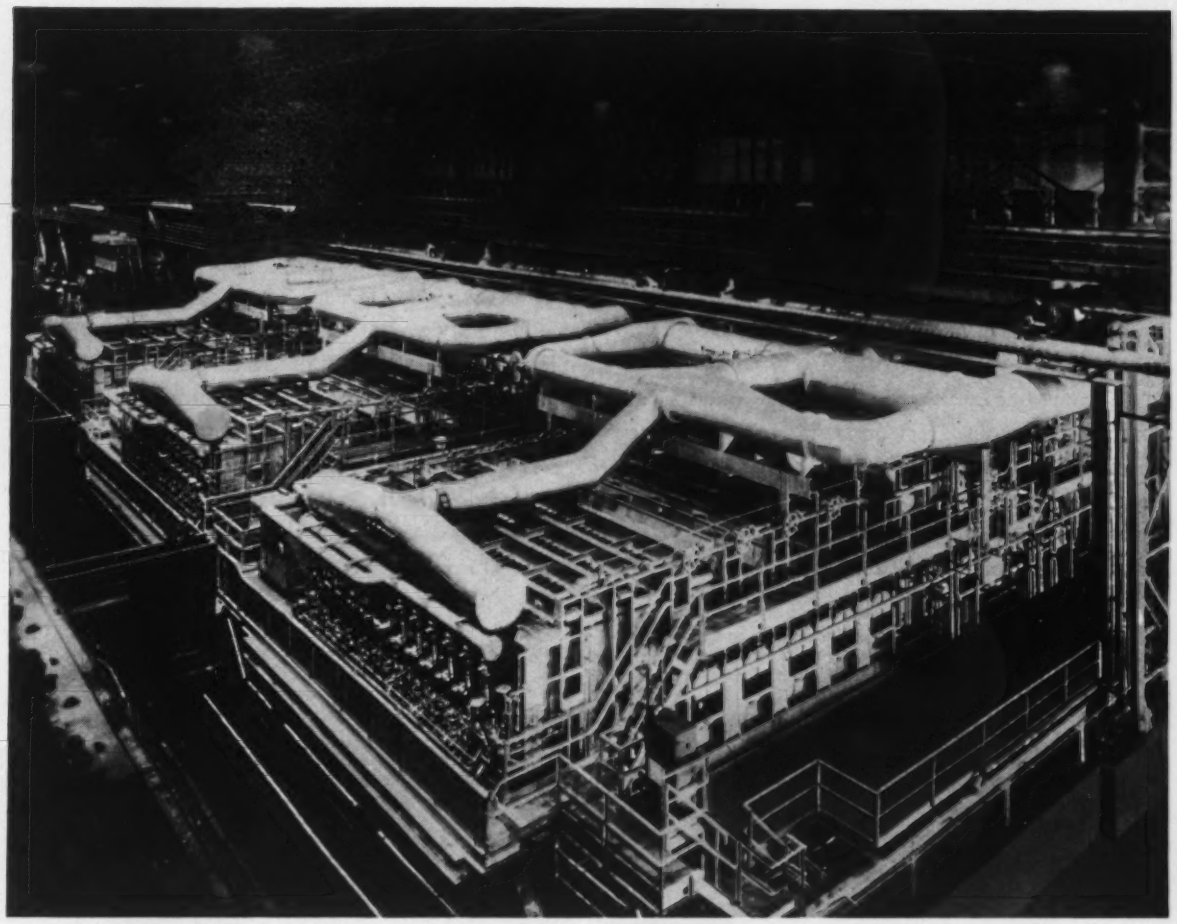
Thus, within the span of a man's hand, are centralized power controls which allow the operator to keep the tool in the cut more of the time — thereby reducing costs and increasing profits.



For Complete Information,
ask your nearest Bullard Sales Office for a catalog or write to

*Trade Mark

THE BULLARD COMPANY • BRIDGEPORT 9, CONNECTICUT



Youngstown Sheet and Tube Company gets more output, flexible control with Loftus 5-zone reheating furnaces

These three, 100-foot long Loftus continuous slab reheating furnaces serve the 79″ hot strip mill at Youngstown's Campbell works.

Heating rates and thermal gradients are closely controlled in these fully automated units. Maximum design production is 260 tons/hour. Furnace features include balanced air supply to all burners, multi-fuel automatic controls and full metallic recuperation.

Loftus has developed broad engineering and design capabilities in two decades of service to metals producers. We would be pleased to discuss your expansion or modernization requirements.

Engineering-design services for industry by **LOFTUS**
Engineering Corporation

61-6A

1 Gateway Center, Pittsburgh 22, Pa.

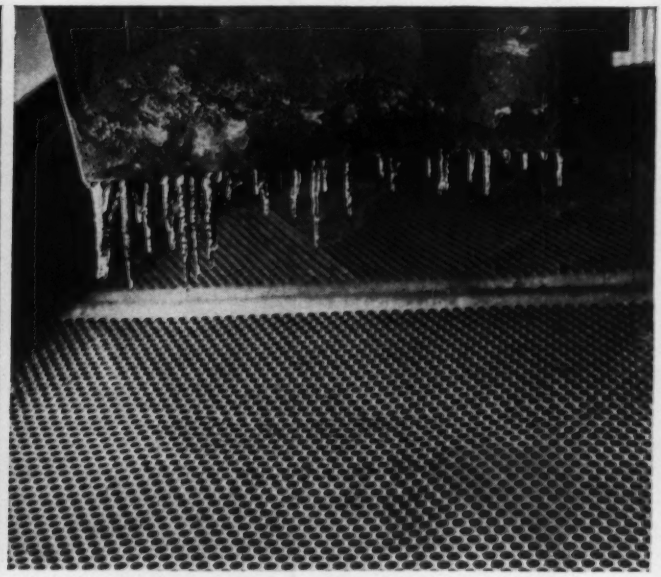
Want a sales edge in the market?

Durability and Stainless Steel enjoy an association that started years ago. In fact, some of the earlier applications of Stainless Steel are still around today, shining examples of real durability. This is a key point: the products are still serving today, and the *primary* point is that the people who purchased them are satisfied.

To provide the market with a product that satisfies is simply good business. It is in this vital product planning area where Stainless Steel can deliver the edge. It will hold up. It provides durability. It is strong, attractive, corrosion resistant.

The decision to swing to Stainless Steel takes measured judgment. It is not an impulse item. It costs more than ordinary materials, but to repeat a cliché, "First cost isn't everything." After all, an

Stainless brightens your home . . . This gleaming Stainless fireplace will last for the lifetime of the home it graces. It will *keep* its gleam, too, because Stainless doesn't corrode and it can be wiped clean with a damp cloth. This maintenance-free fireplace by Vega Industries, Inc., Syracuse, New York, can be installed in less than one day, in any room in the house, whether the home is new or old. Because of its Stainless Steel construction, installation costs are cut as much as fifty per cent.



Stainless Steel works in the coal mine . . . Coal screens, where coal is graded or cleaned, take a daily battering. They are subject to strong acids and water. If they are Stainless, there's no problem. Strong Stainless stands up to rough handling, and its superior corrosion resistance eliminates one of mining's biggest headaches. Stainless Steel screens last many times longer than screens of other materials, making it one of the industry's best investments.

Order Stainless Steel from your nearest Steel Service Center.

Get it with durable USS Stainless Steel

improved product, durability and possibly more market satisfaction deserve consideration. If you feel inclined to learn more about the proper grade of Stainless Steel for your products, write, wire or phone. There is an opportunity in the market today for the durability that Stainless Steel can deliver. United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

Ever hear of a Stainless trailer wearing out? Nobody ever did. Are they durable? Once a Stainless Steel trailer loaded with lamp black caught fire. Cargo and tires burned up. But not the Stainless Steel. They put new running gears on it and it was as good as new. Since Stainless is so strong, this Fruehauf Trailer is lighter and can carry bigger payloads. Since Stainless resists corrosion, painting is unnecessary, and corrosive road salts or harsh industrial atmospheres are never a problem.

. . . and in the ice cream parlor. If you want your restaurant equipment to be attractive as well as long-lasting, make sure it's Stainless. Here is an all-steel unit that includes an ice cabinet, walk-in cooler, beverage dispensers and syrup rail. Its gleaming Stainless front is easy to keep sanitary. Cleaning agents won't harm it and it will *stay* bright and shiny. All the best restaurants (and home kitchens as well) use Stainless Steel for long life, cleaning ease, attractive appearance. This all-steel unit was manufactured by Erickson Industries of River Falls, Wisconsin.

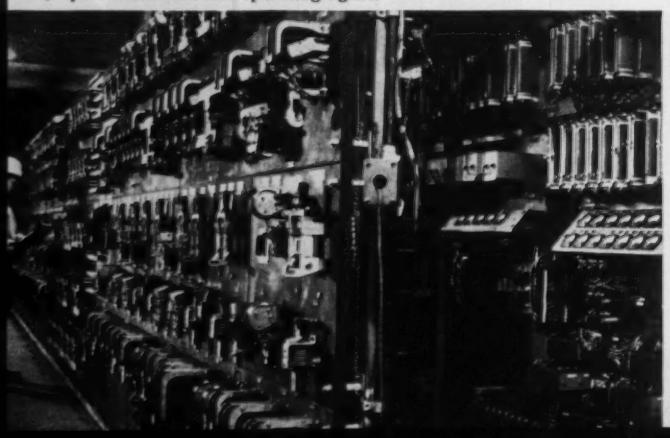
Stainless welcomes your customers . . . This door is Stainless Steel. It creates a first impression that counts—sets off the business man who is proud of his firm. Stainless gives store fronts a quality look. Stainless keeps its good looks, too. The rainfall washes it clean. Stainless Steel's strength, attractive appearance and corrosion resistance make it ideal for outdoor locations. Stainless Steel doors are the *best* doors.

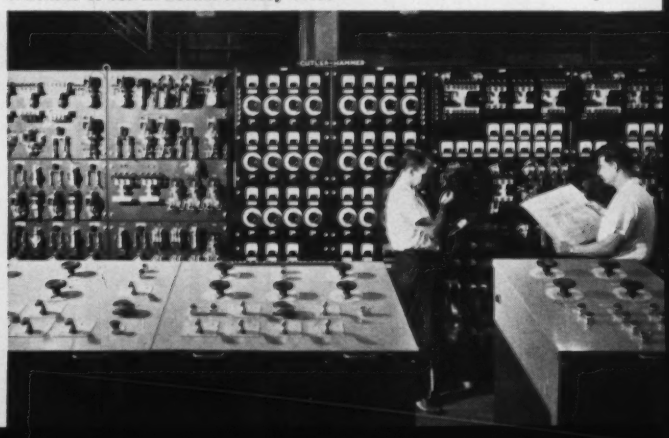
United States Steel USS

TRADEMARK

Cutler-Hammer Control. Shown here, the control of 87 D.C. motors, employing 16 static regulators. Kaiser annealing line control system also regulates 45 A.C. auxiliary motors; requires 10 operators' stations and more than 300 meters, pushbuttons, master switches, potentiometers and operating lights.

Cutler-Hammer Test Floor. Here, complete factory tests of systems control prior to shipment insure faster installation, more trouble-free start-ups. Analog computer-simulator can test engineering solutions before construction; simulate response of any motor or machine to aid in actual factory tests.





What's new in systems control?

Cutler-Hammer Control commands 1600 h.p. High Speed Annealing line at Kaiser Fontana

Big D-c system meets demanding requirements on 1200-FPM line

The responsibility for making the block-long system of huge equipment in a modern annealing line function continuously and in perfect step falls on control engineering. For this responsibility, including all control and rotating equipment, Kaiser selected Cutler-Hammer in the recent expansion of its Fontana works.

The problem: a continuous flow of steel strip through entry, furnace and recoil sections . . . through looping towers on each side of the furnace . . . at 1200 to 1500 FPM!

Laboratory testing speeds trouble-free start-up

Each step posed a critical control problem. Yet Cutler-Hammer's systems and control engineers bound the whole into a smoothly operating team. The entire system was pre-tested in Cutler-Hammer laboratories. Result: Kaiser-Fontana reaped the benefits of a more complete test, quicker installation, and a faster, more trouble-free start-up. Kaiser today produces the uniform quality tinplate demanded by its customers.

Cutler-Hammer control systems and equipment were installed on seven of the first nine high-speed annealing lines built. Cutler-Hammer engineering and equipment is also at work on the Fontana pickling line, coil preparation line, and in auxiliaries for slabbing, hot strip and temper mills.

Call the C-H man . . . early!

Cutler-Hammer's broad experience in all phases of systems control design means the Cutler-Hammer man brings a knowledgeable eye to your particular control problem. Cutler-Hammer procedures insure a complete pre-test of your system. Assure you a quicker installation and a faster, trouble-free start-up. Call your nearby Cutler-Hammer office early.

WHAT'S NEW? ASK...

CUTLER-HAMMER

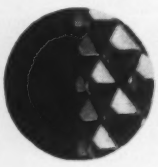
Cutler-Hammer Inc., Milwaukee, Wisconsin • Division: Airborne Instruments Laboratory • Subsidiary: Cutler-Hammer International, C. A. • Associates: Canadian Cutler-Hammer, Ltd.; Cutler-Hammer Mexicana, S. A.

BAY STATE MOUNTED WHEELS

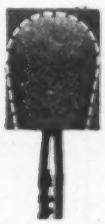
set a new standard

Bay State has just completed a concentrated research and engineering program designed to make Bay State mounted wheels the finest available anywhere. Results are paying off for users in more uniform grinding action . . . easier operation . . . and virtually complete elimination of defective materials and workmanship. These wheels are as nearly perfect as the most advanced abrasive technology can make them.

POSITIVE WHEEL-TO-MANDREL BOND Deeply knurled mandrel ends and specially formulated bonding material weld wheel and mandrel into a single, rock-solid unit. Constant, rigid quality control tests are made to check this Bay State feature.

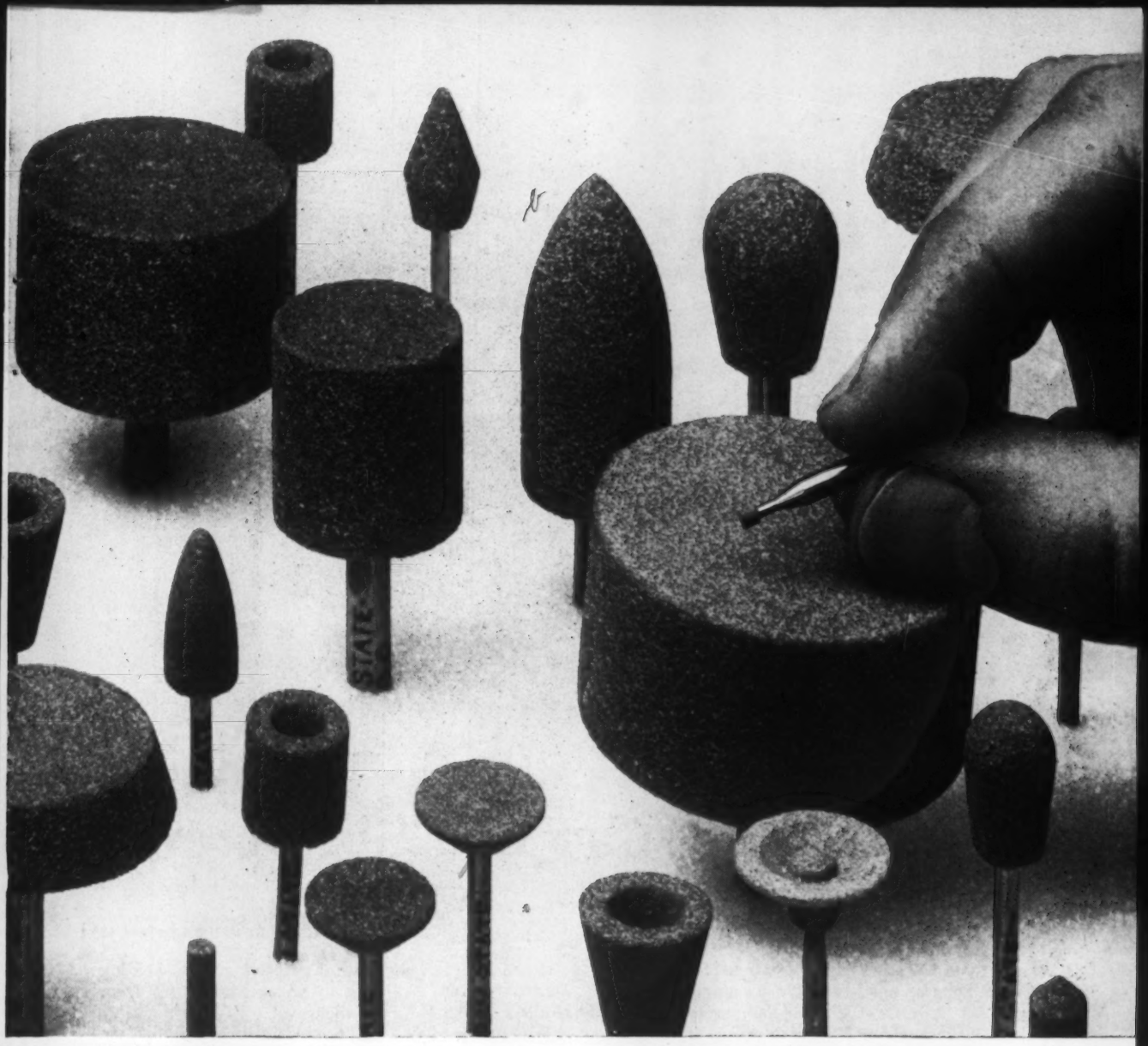


SUPER-ACCURATE CONCENTRICITY Every wheel is molded oversize and then *ground to shape on its own mandrel* so that it *automatically* becomes perfectly symmetrical and is perfectly concentric with the center of the mandrel itself. *Result:* Every wheel runs true from start to finish . . . no breaking in required . . . no hard spots, no soft spots, the whole wheel does a 100% job of grinding right down to the mandrel.



BAY STATE WHEELS of PROGRESS

BAY STATE

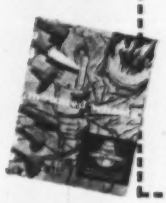


# of excellence for the industry

MAXIMUM MANDREL UNIFORMITY Mandrel diameters are uniform to very close tolerances. No fumbling when operator changes wheels because new wheels can be locked into place with a minimum change in the collet or chuck setting.

COMPLETE INVENTORY IMMEDIATELY AVAILABLE Hundreds of different combinations of shape, grit, size, porosity, bond and mandrel size are in stock, ready to be shipped to users immediately. Bay State's 30-page catalog makes it simple to choose the specs you need for any job.

For special mounted wheels, call your Bay State, direct or distributor, representatives. They are abrasive specialists. *Better grinding at lower cost . . . that is their business.*



Bay State Abrasive Products Co.
Westboro, Mass.

Please send me the new Bay State Mounted Wheel catalog with full technical information on the best mounted wheels available to industry.

Company _____

Name _____

Address _____

City _____ *State* _____

ABRASIVES

Bay State Abrasive Products Co., Westboro, Massachusetts.

In Canada: Bay State Abrasive Products Co., (Canada) Ltd., Brantford, Ontario.

Branch Offices: Chicago, Cleveland, Detroit, Los Angeles, Pittsburgh. *Distributors:* All principal cities.

PQA*

gives you better stainless products!

ALLEN Stainless Steel Cap and Set Screws

- NON-CORRODING
- HIGH TENSILE STRENGTH
- HEAT RESISTANT
- BRIGHT, LUSTROUS FINISH

Allen offers you 190 stock sizes in Stainless Steel Socket Head Cap Screws, now available as standard items in Type 18-8 Stainless or equivalent quality with '60 Series or '36 Series head diameters. Sizes range from No. 0 x 1/8" to 5/8" x 3", inclusive. Smooth heads supplied unless grip heads are specified.

Stainless Set Screws with deep-driving, tight-holding ALLENPOINT are available in 54 standard sizes from No. 0 x 1/16" to 1/2" x 1", inclusive.

When designs call for bright finish and ability to stand up to corrosion, you'll find Allen the answer in the largest range of sizes.

*PRODUCT QUALITY ASSURANCE

PQA, symbol of unquestioned quality at Allen, stands for *constant* quality control from upgrading of incoming raw materials to shipment of *unconditionally guaranteed* finished products.

PQA goes further. It brings you such helpful information as this STAINLESS STEEL DATA (G22) brochure, comparing stainless steel alloys according to advantages, limitations and applications. It lists chemical composition and mechanical properties of 40 widely used stainless alloys; gives comparative corrosion resistance to various media, elevated temperature service data, and other characteristics of stainless steels.

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Genuine ALLEN products are available only through your ALLEN Distributor. He maintains complete stocks close by to help cut your freight costs, inventory, warehousing and handling. He offers fast, single-source service. He knows ALLEN products. And he makes ALLEN Engineering Service available to you. Call him!

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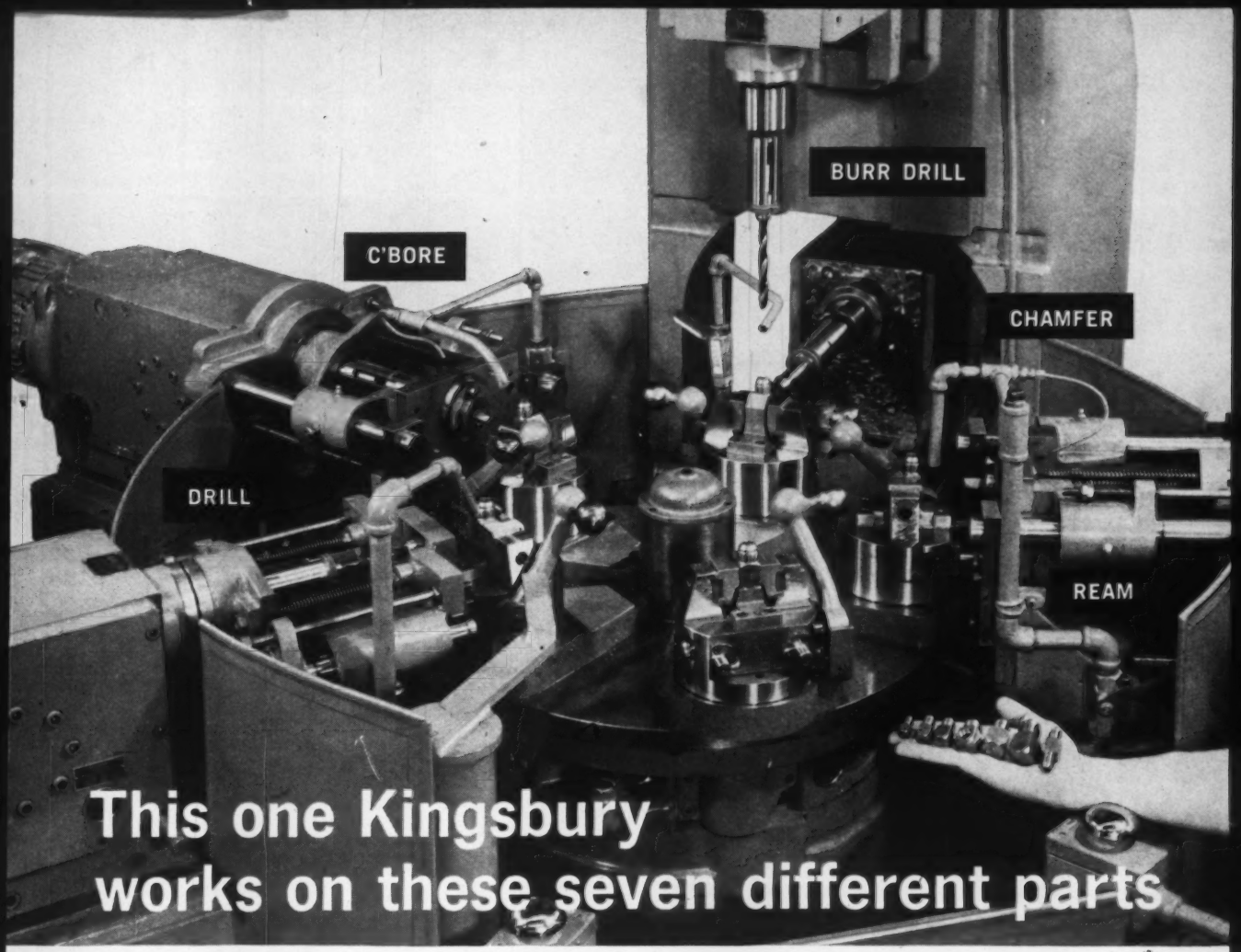
ALLEN HEAD
HEX-SOCKET SCREWS

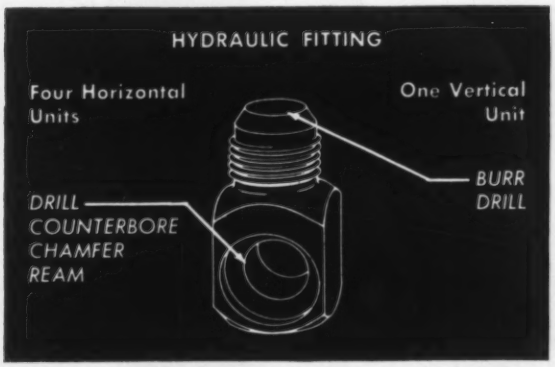


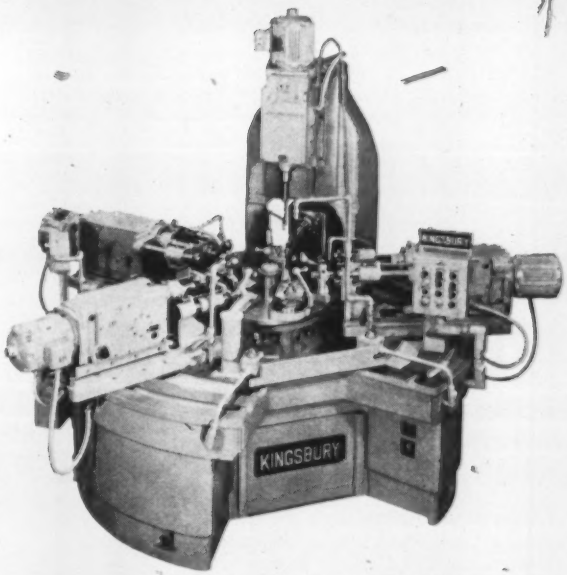
This one Kingsbury works on these seven different parts

This Kingsbury machine is fairly simple — just five units and six stations. The work pieces are held in two-jaw chucks with interchangeable locating jaws and clamps. The gross production rate for five parts is 500 parts per hour. On the sixth part it is 340, and on the seventh part with two chuckings it is 250 per hour.

Normally our machines are far more complex than this. But this one does show that our simpler machines also pay off. With good basic design and rugged accurate construction, they have little downtime. And uniform, accurate cycles produce little scrap.

May we quote you on a job, either simple or complex? Kingsbury Machine Tool Corp., Keene, New Hampshire.





KINGSBURY MULTI-UNIT AUTOMATICS

An automatic coiler forms .063 Johnson tinned music spring wire into an automobile brake cylinder spring. Because this spring will spend its life in a bath of corrosive brake fluid it needs a heavy, uniform tin plating that will not peel, crack or flake. It is a critical spring with 12½ coils, held to tight tolerances and coiled with two different end sizes. The larger end is 1.034 inches while the smaller end is .710 inch.

Mid-Continent Spring Company of Ky. says . . .

Dependable Johnson Music Spring Wire Gives Precision Springs Reliability

Dependable quality and quick service are two major reasons Johnson wire is specified in Kentucky spring plant

"After 23 years in the spring manufacturing business, I'll give you my one-word description of Johnson Steel & Wire Company's spring wire . . .

"It's DEPENDABLE."

So says L. B. Langhi, president of Mid-Continent Spring Company of Ky.

And that goes for Johnson's high carbon wire destined for springs that snap into action at the critical moment of a missile launching or simply make a baby doll wink, as Mr. Langhi explains.

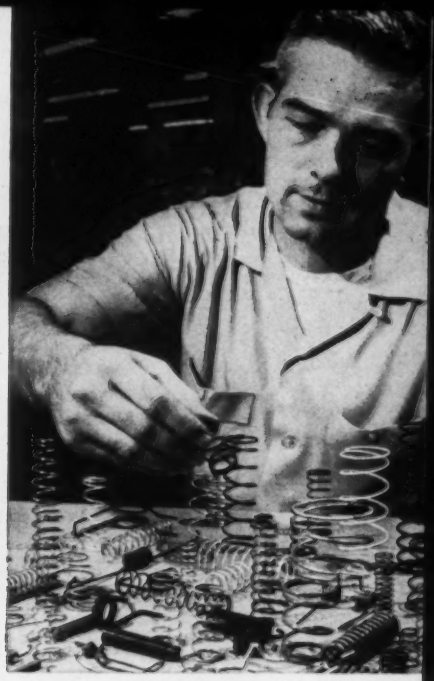
Regardless of their job, it's vitally important to Mid-Continent's customers that springs function with precision. So the firm's plant at Hopkinsville, Ky., builds reliability into all its products, whether for space flights, toys, automotive and electrical parts or vending machines.

This reliability depends as much upon the raw materials of the springs —music spring wire or oil tempered spring wire—as it does upon the skills of Mid-Continent's spring makers.

Mr. Langhi said: "Because our customers depend upon our springs to give them a full measure of value, we demand and get wire from Johnson that has a uniform quality in finish, temper, size and physical properties.

"Coatings on Johnson tin-coated

A carburetor control extension spring must be held to unvarying tolerances to insure consistent performance. This important spring is made of Johnson .010 tinned music spring wire, has an O.D. of .118 inch and measures ¾ inch outside the loops.



R. M. Worthman, purchasing agent for Mid-Continent Spring examines some of the one thousand different type springs manufactured at Mid-Continent.

This tiny vending machine extension spring is made of Johnson .013 tinned music spring wire, has .158 I.D. and 22 turns.

music spring wire are both uniform and adherent. This eliminates peeling, cracking or flaking during our coiling operation."

High physical properties, uniform cast and smooth surfaces are other important requirements since Mid-Continent springs must form within strict dimensions and carry precise work loads.

At Mid-Continent, accuracy of wire dimensions greatly affects spring coiling and performance. Close tolerances on dimensions are met consistently in fine wire specialties produced by Johnson Steel & Wire Company.

"Our production averages over a million springs per day," said R. M. Worthman, purchasing agent for Mid-Continent Spring.

"Because of this, we keep our warehouse stocked with at least 300 tons of wire. Johnson supplies us with a range of .008-inch to .207-inch music spring wire and oil tempered wire.

"Whenever our wire stock begins to deplete, we're able to call for and get fast delivery service from Johnson's mill in Worcester or from its warehouses in Chicago or Akron.

"Of the 64 different types of brake drum springs we manufacture, 90 percent of them are made of Johnson wire. That's what we think of Johnson Steel's wire."

Let Johnson start today to help you with your high carbon spring wire needs.

Just call the nearest district sales office and talk with a Johnson representative. He's ready to help you with whatever your wire and spring problems might be—right now.

Johnson Steel & Wire Company, Inc.

Worcester 1, Massachusetts

a subsidiary of **Pittsburgh Steel Company**

Grant Building • Pittsburgh 30, Pa.

DISTRICT SALES OFFICES

Akron	Cleveland	Detroit	Los Angeles	Pittsburgh
Chicago	Dayton	Houston	New York	Tulsa
			Philadelphia	Warren, Ohio

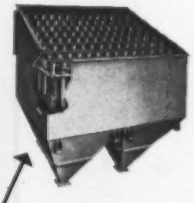
EXPERIENCE

...OUR PLUS
to solve industry's toughest gas cleaning problems

Nearly 50 years' experience as the leading engineers and manufacturers of gas cleaning equipment.

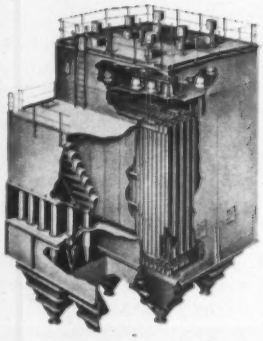
Hundreds of installations in various industries throughout the world, collecting dusts, fumes and mists, and cleaning gases from many sources. Here is partial list of applications.

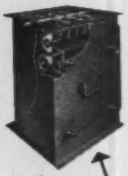
POWER—Fly ash collection
STEEL—Basic oxygen, sintering and open hearth dust collection.
PAPER—Sodium salts recovery
CHEMICAL—Aerosol and acid mist collection
METALLURGICAL—Metallic dusts and fumes collection
CEMENT—Kiln and finish mill dust collection
GYPSUM—Kettle, mill and dryer dust collection
PETRO-CHEMICAL—Catalyst recovery
RUBBER—Carbon black collection



High Efficiency, Reliable Low Operating Cost, Low Maintenance Cost, Industrial Gas Cleaning Equipment:

Cottrell Precipitators
Collection efficiencies of over 99% are being obtained and guaranteed with Research-Cottrell Precipitators.





Cyclo-trell Mechanical Collectors
These low first cost high efficiency collectors provide greater separating forces and reduction in over-all resistance (pressure drop) than other types of mechanical collectors. They are available in multiple tube and involute designs.

Combination Electrostatic-Mechanical Collectors
Under some conditions the most economical solution to a gas cleaning problem is a combination of the Cyclo-trell ahead of or after a Research-Cottrell Precipitator.

Electrostatic Air Cleaners
Custom air cleaners such as those Research-Cottrell developed for the Navy's nuclear submarines are available for special applications.

Flooded Disc Scrubber
Adjustable—High efficiency. No increase in pressure drop, even at gas flows 50% over normal. No nozzles to wear or plug up.

Complete System Evaluation
Research-Cottrell's pioneering work and continuing experience with three-dimensional model studies has enabled us to appraise the complete gas cleaning system and engineer the products which guarantee high efficiency performance in every application.

If you have a gas cleaning problem that requires an economical solution, contact Research-Cottrell today.

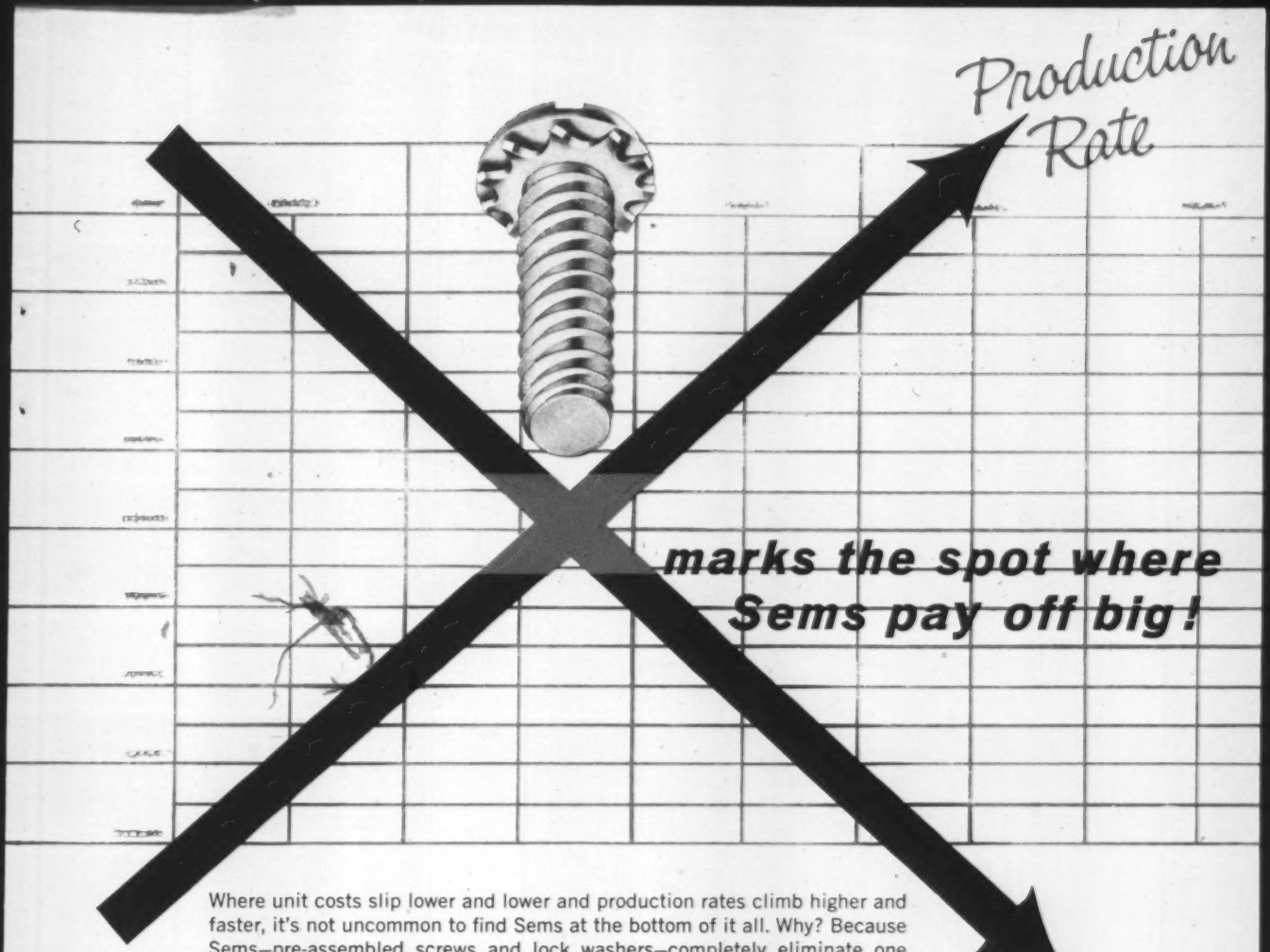
Research-Cottrell

COTTRELL®

MEMBER OF THE INDUSTRIAL GAS CLEANING INSTITUTE

RESEARCH-COTTRELL, INC. Main Office and Plant: Bound Brook, New Jersey
Representatives in principal cities of U. S. and Canada

RC-224



marks the spot where Sems pay off big!

Where unit costs slip lower and lower and production rates climb higher and faster, it's not uncommon to find Sems at the bottom of it all. Why? Because Sems—pre-assembled screws and lock washers—completely eliminate one step and make others much more efficient. For example, washers will never be forgotten or mismatched, assembly quality improves, you can use hopper-fed driving and there's a Sems for every need. Put us on the spot, we'll be happy to show you how it can pay off big with Sems!

SEMS AVAILABLE WITH GENUINE SHAKEPROOF® *LIVE ACTION* LOCK WASHERS. Exclusive 3-way locking action of Shakeproof Live Action Lock Washers is available to Sems users. Just specify Shakeproof Lock Washers on Sems.

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itw Sems pre-assembled screw and lock washer

SEMS IS A DEVELOPMENT OF ILLINOIS TOOL WORKS INC., CHICAGO

SEMS SERVICE FROM 42 SOURCES . . . NATIONWIDE SO SEMS SERVICE IS ALWAYS NEAR AT HAND

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CENTRAL SCREW COMPANY
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CONTINENTAL SCREW CO.
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Torrington, Connecticut

REED & PRINCE MANUFACTURING COMPANY
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REPUBLIC STEEL CORPORATION
Cleveland 13, Ohio

RING SCREW WORKS
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ROCKFORD SCREW PRODUCTS COMPANY
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RUSSELL, BURDSALL & WARD BOLT & NUT CO.
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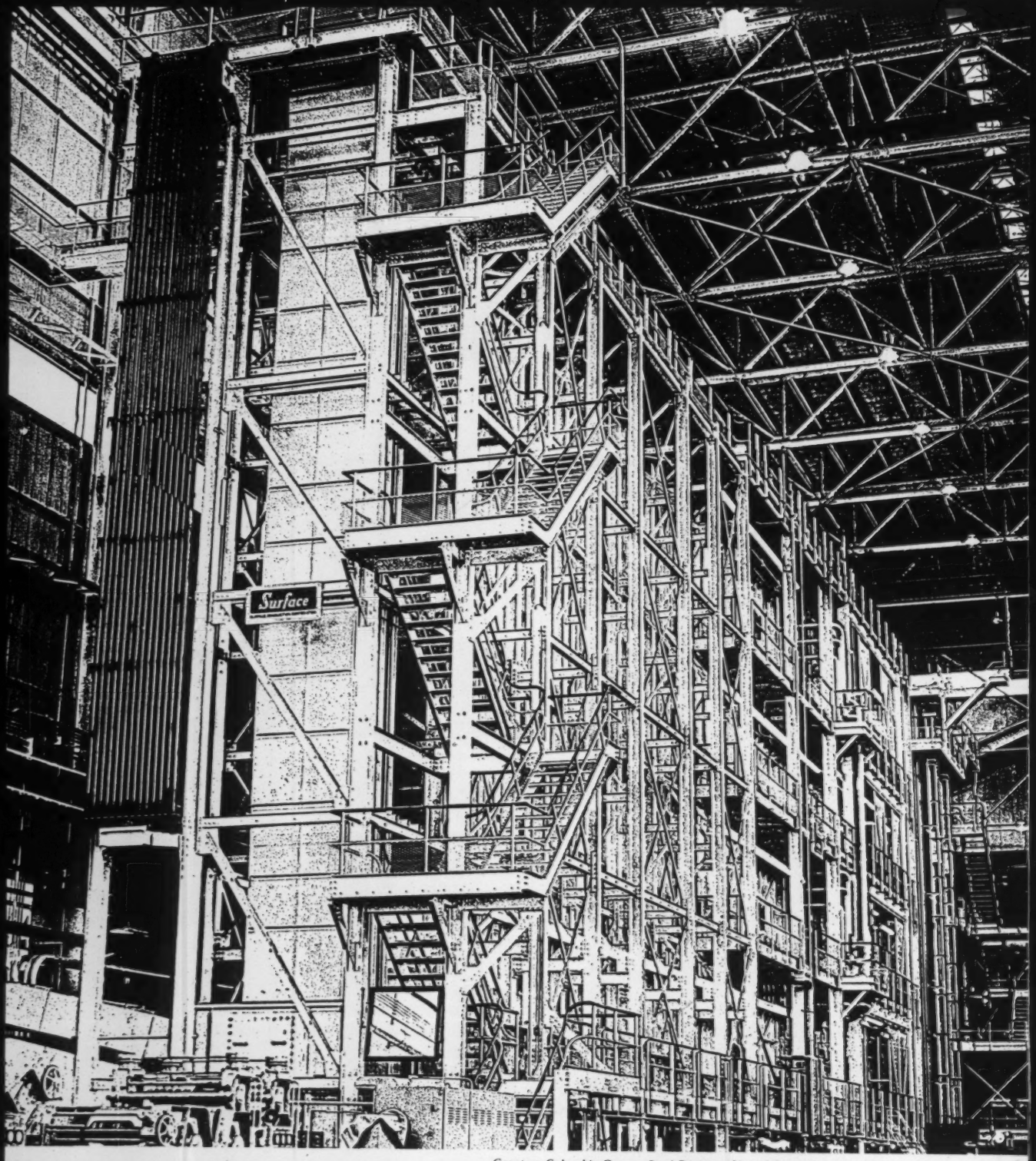
For information on SEMS sources in Canada, Contact:

CANADA ILLINOIS TOOLS LTD. SHAKEPROOF—FASTEX DIVISION
Toronto, Ont., Canada



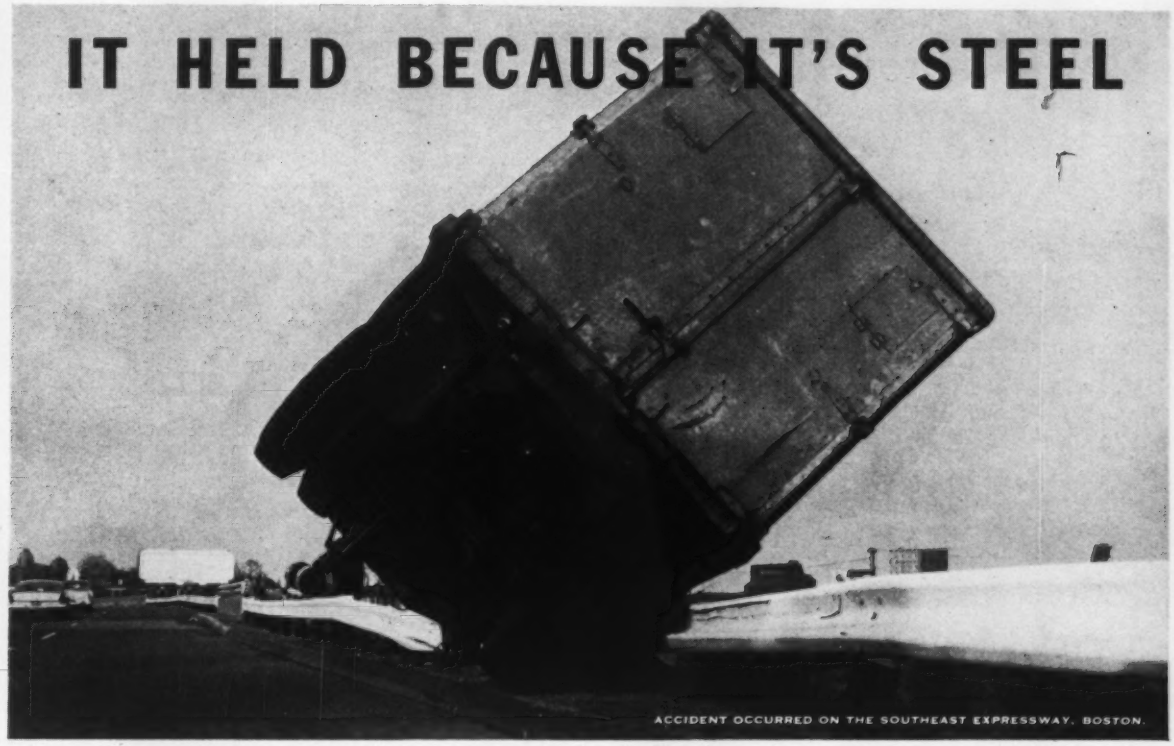
Courtesy Columbia-Geneva Steel Division, United States Steel Corporation

Sign of performance better than specified: The modern tin plate industry demands highest quality at lowest operating cost—requirements which can be met only with continuous annealing, a process pioneered by Surface. This Surface installation produces 96,000 lbs/hr of .010″ strip at speeds up to 1500 fpm. Address inquiries to 2402 Dorr Street, Toledo, Ohio.

SURFACE

SURFACE COMBUSTION, Toledo 1, Ohio/ a division of Midland-Ross Corporation MR

IT HELD BECAUSE IT'S STEEL



ACCIDENT OCCURRED ON THE SOUTHEAST EXPRESSWAY, BOSTON.

—Guarding Steel's Strength Is A Job For ZINC

This picture is a dramatic example of how steel guard rails are saving lives on our highways. The resilient strength of the steel rail and posts kept this truck from plunging down a steep bank to a highway below.

Results of steel guard rail installations on the New Jersey Turnpike, Cross County (Westchester, N. Y.) Parkway, Belt Parkway in New York and other major highways prove the life-saving ability of these barriers. Many of the 15,800 fatalities which in 1960 resulted from vehicles crossing to the wrong side of the road or going off the road could have been prevented by guard rails.

Galvanized steel guard rail costs less than competitive materials such as aluminum or concrete. In addition, it is stronger than aluminum and has a shock-absorbing resiliency not present in concrete barriers. *The zinc coating guards steel's strength and appearance against corrosion. The tough zinc hide can take the bangs and scratches of highway abuse without losing its protective ability.*

THIS GUARD RAIL DIDN'T HAVE STEEL'S STRENGTH—Aluminum guard rail on the Long Island Expressway was broken by collision impact.

—AND THE ZINC FOR THE JOB—

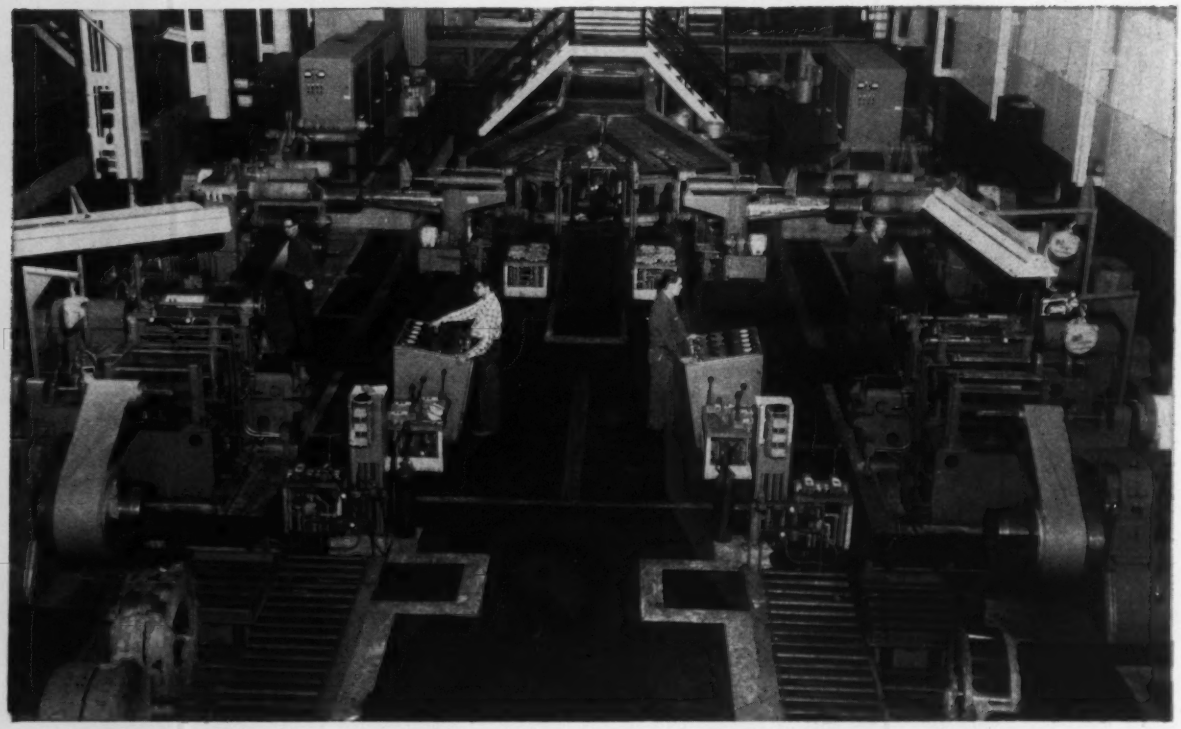
ST. JOE

ST. JOSEPH LEAD COMPANY

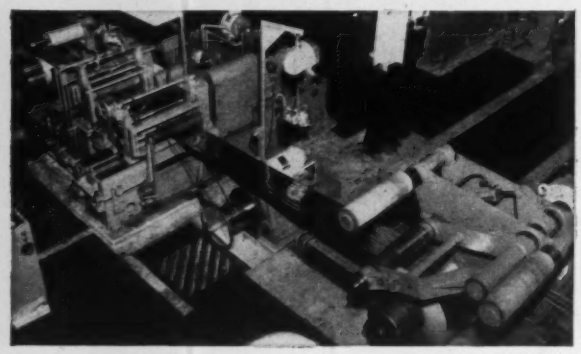
250 PARK AVENUE

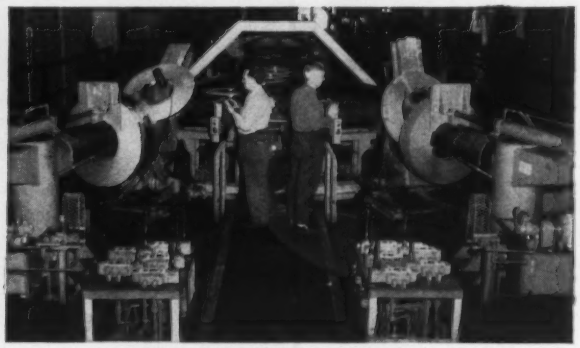
NEW YORK 17, NEW YORK

ZN-198



Predictable Performance...





SECO Slitting Installation, Superior Steel Division, Copperweld Steel Company, Carnegie, Pa.

is automatic—start to finish—with a SECO Slitting Line

SECO STEEL MILL EQUIPMENT

- Leveling and Shearing Lines
- Combination Edging and Flattening Lines
- Tension Reels for Strip Polishers
- Narrow Strip Grinding Machines
- Slitting Lines
- Multiple Strand Pull-out Rolls and Take-up Frames
- Strip Coilers (Up and Down Type)
- Traverse Reels for Narrow Strip
- Steel Coil Up-enders
- Scrap Ballers

Affiliated with Lee Wilson Engineering Co., Inc.

Every operation in this *complete* slitting line by SECO—from entry to exit of coils—is fully automated. It was specifically designed and built by SECO to meet the maximum performance requirements of the Superior Steel Division, Copperweld Steel Company, Carnegie, Pennsylvania.

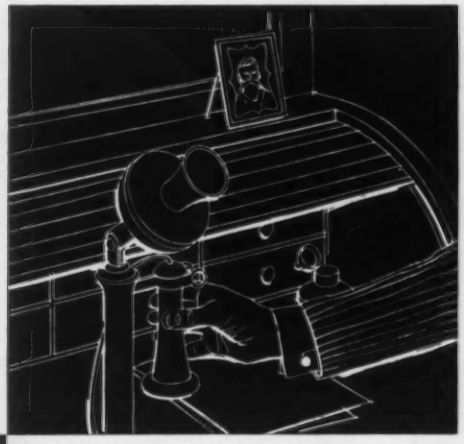
SECO's staff of experienced sales engineers, specialists in production problem solving, are prepared to show you how you can get "predictable performance" in *your* operation—whatever your requirements. Call or write today. West Coast representative: United Machine Tool Company, Los Angeles, California.

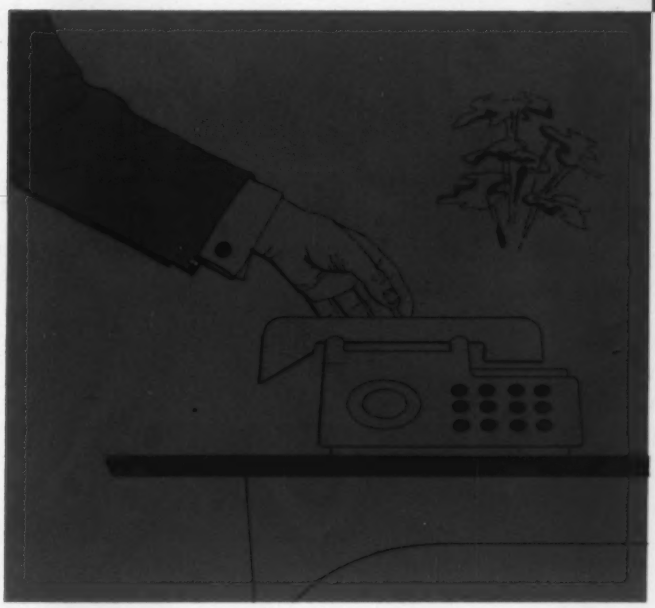
STEEL EQUIPMENT COMPANY

P. O. BOX 737, WARRENSVILLE STATION • CLEVELAND 22, OHIO

SANDVIK QUALITY

Is Earning Its *Second* Generation of Satisfied Customers



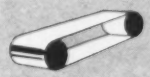


In over 40 years of tough competition, SANDVIK quality has earned, held and expanded SANDVIK'S place in American industry.

To keep old customers and to make new ones over the years, Sandvik *had to deliver superior performance, consistently*. Nothing else explains Sandvik's growth.

5 SANDVIK QUALITY PRODUCT LINES

SPECIALTY COLD ROLLED SPRING STEELS
STAINLESS WIRE AND TUBING



STEEL BELT CONVEYORS AND PROCESSING UNITS

CORONANT CARBIDE TOOLING

POWER SPRINGS

HAND SAWS AND TOOLS

SANDVIK

SS-237

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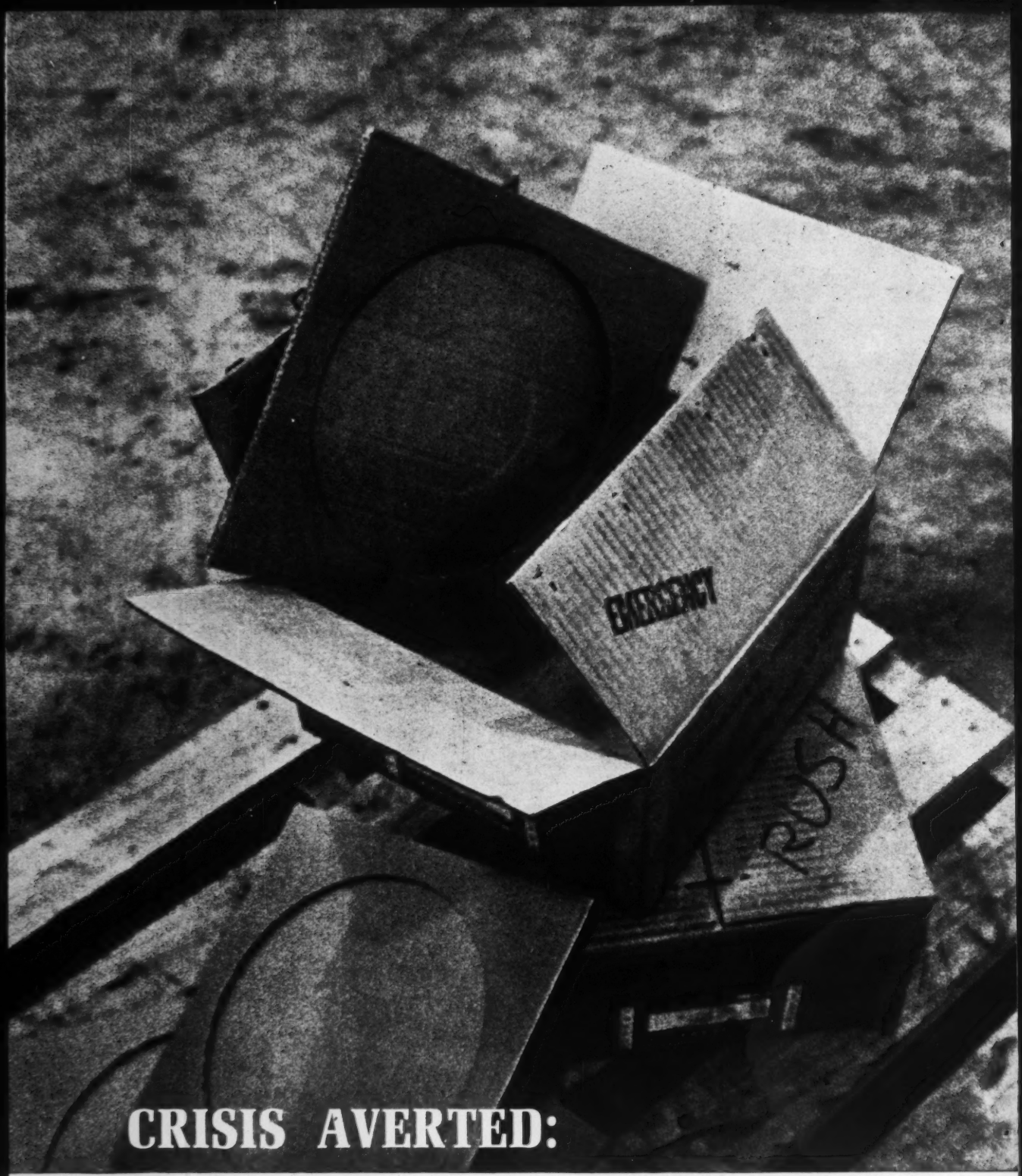
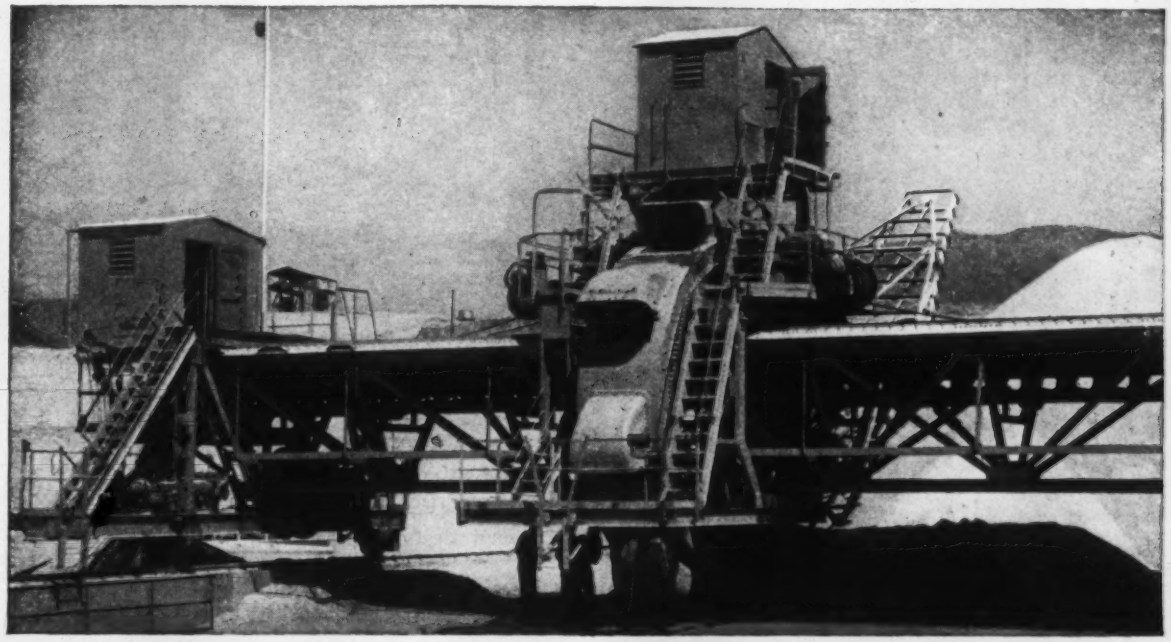
Branch Offices: Cleveland • Detroit • Skokie, Ill. • Los Angeles
SANDVIK CANADIAN LTD: P. O. Drawer 1335, Sta. O, Montreal 9, P. Q.
Works: Sandviken, Sweden



CRISIS AVERTED:

Not every grinding wheel order springs from an industrial crisis. but when there *is* a hands-down emergency—when you're in a cross-fire of urgent demand that only an opened container on your shipping dock can satisfy—Carborundum's electronic order processing service can be your answer. By split-second Univac II control, Carborundum can instantly search a nationwide chain of warehouses for the item you need—place it under teletype order for air shipment—slam the door in the face of crisis. For your critical items . . . as for your everyday requirements . . . Carborundum is your key to superior abrasive service. **CARBORUNDUM**



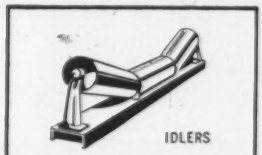
BIG WHEEL

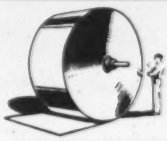
It blends... it reclaims... it ends inefficiencies of selective mining

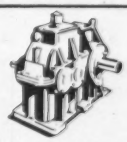
As part of a new H-R Rotary Bucket Wheel Blending and Reclaiming System, this giant 3-story wheel is capable of processing efficiently a broad range of materials . . . especially where more than one of the following typical situations exist:

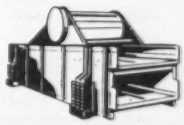
1. Engaged in selective mining
2. Unable to comply with specifications
3. Too much coarse or fine material in feed
4. Storage pile requirements range 50,000 tons and over
5. Two or more types of raw material to blend for chemical compounding.

For full details consult your H-R representative, or write Hewitt-Robins, Stamford, Connecticut. Ask for Bulletin 9-62


IDLERS


CONVEYOR BELTING


SPEED REDUCERS


VIBRATING EQUIPMENT

HR HEWITT-ROBINS

THE NAME THAT MEANS EVERYTHING IN BULK MATERIALS HANDLING SYSTEMS...

CONVEYOR BELTING AND IDLERS • INDUSTRIAL HOSE • VIBRATING FEEDERS, SCREENS & SHAKEOUTS • POWER TRANSMISSION EQUIPMENT

TOO SLOW ?

Emphatically not! . . . ask any visitor to the 1960 Machine Tool Exposition who watched a Marvel No. 6 Hack Saw Machine cut-off 3¼" diameter 1018 steel in 27 seconds! This Saw, costing less than $3000, was actually cutting at the rate of 18 square inches per minute!

We made the above demonstration merely to "match" what we believe to be the impractical demonstrations of some of our competitors. OUR visitors were warned that continuous cutting at this speed is economically impractical if maximum blade life and accuracy (after the first 20 cuts) are desired. They were told that the material could be cut day in and day out, at the rate of 8 square inches per minute with tool cost of approximately 1 cent per cut.

Our point? Marvel No. 6 and No. 9 Series Heavy Duty Ball Bearing Hack Saw Machines, as we build them today, have speed to spare. And they offer the most accurate, economical cut-off at the lowest initial investment.

Ask your Marvel Dealer to arrange a sawing demonstration—on your own work—if you wish. Because we have consistently built both Hack Saws and Band Saws for more than 40 years, you will get an unbiased recommendation.

Catalog C60 illustrates and describes the complete line of Marvel Sawing Machines. Write for your copy.

MARVEL *Metal Cutting* **SAWS**

BETTER MACHINES
BETTER BLADES

ARMSTRONG-BLUM MANUFACTURING CO. • 5700 Bloomingdale Avenue • Chicago 39, Illinois

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HIGH SPEED STEELS
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MARATHON

SPECIALTY STEELS, INCORPORATED

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Don't get boxed in by oxygen supply problems...

Keep your steel operations flexible by removing all uncertainties about oxygen supply with an Airco tonnage oxygen plant. A plant we build and operate for you — on or adjacent to your site — gives you assurance of supply that only an experienced oxygen producer like Airco can guarantee.

GUARANTEED BACK-UP. Your oxygen plant is backed up by Airco's nationwide network of oxygen plants. If the plant is down for any reason, Airco will keep your oxygen flowing from its integrated system. If you need more oxygen than originally anticipated, Airco will supply whatever quantities you require. And you won't be boxed in with a rigid purchase arrangement that can't be adjusted to steel production.

PROVEN TECHNOLOGY. Making oxygen — like making steel — is a specialized business. Airco has 45 years'

let Airco build and operate a plant for you

experience in low-temperature technology . . . design, engineering and construction proficiency that has dotted the country with oxygen plants — including the first on-site oxygen plant for steel. There's no first-plant guesswork . . . late starts . . . long debugging periods that ruin your production schedules.

ASSURED LOW COST. Your oxygen is available fast . . . at a firm, fair price that reflects the economies provided by Airco's large resources and long experience.

For the full oxygen story, write, wire or phone today.

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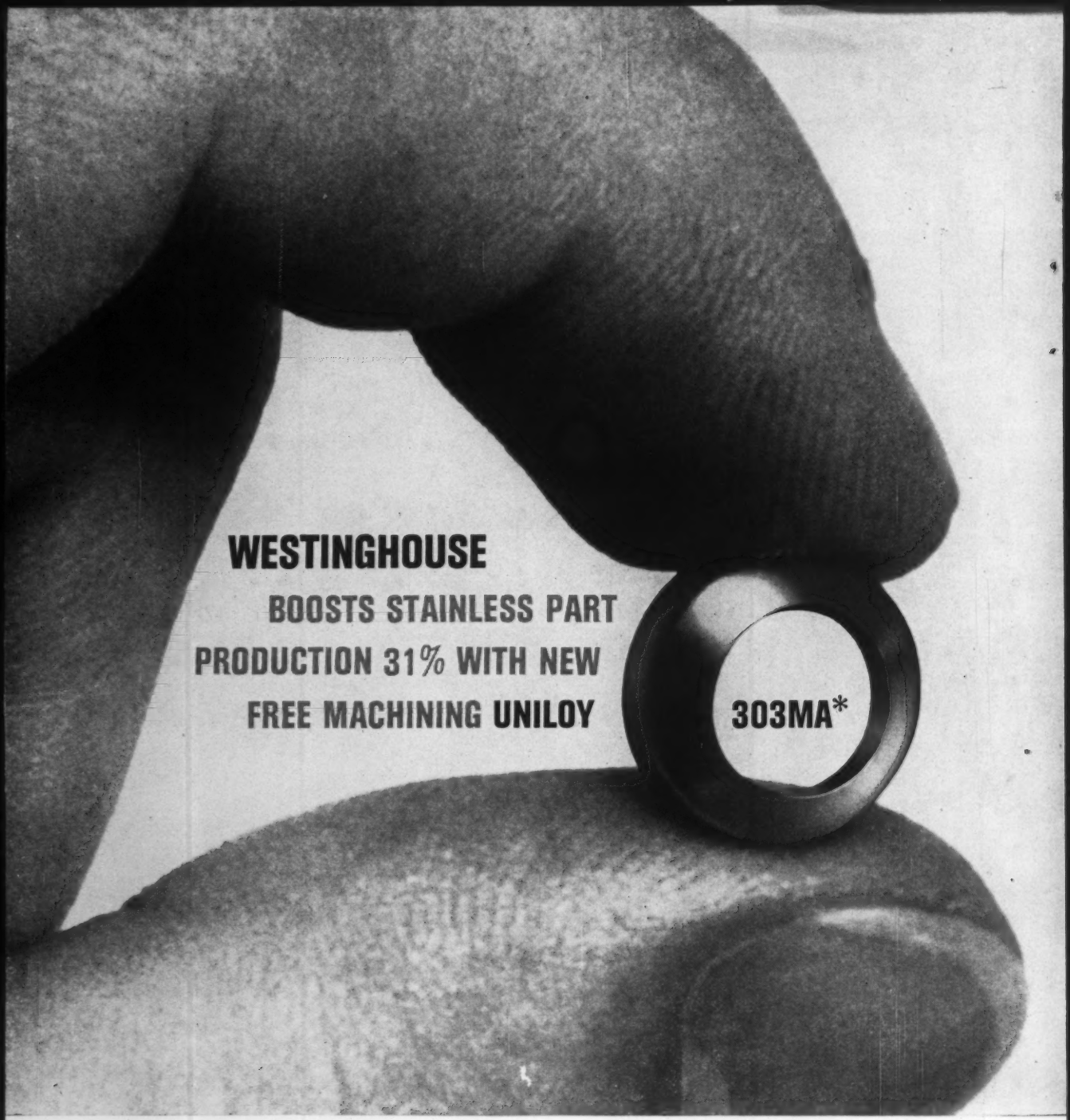


The Westinghouse Standard Control Division at Beaver, Pa., compared New free machining Uniloy 303MA* stainless steel with regular Type 303. The part—a close tolerance spring end support for circuit breakers and control equipment—was machined from ½-inch stock. Here are the production line results:

	AISI Type 303	New Uniloy 303MA
Spindle Speed	890	1180
Surface Ft. per Min.	115	155
No. Pieces per Hour	110	144
Tool Life	Form tool sharpened 3 times every 8 hours	Form tool sharpened once every 6 hours

New Uniloy 303MA also machined cleaner and smoother to produce higher quality parts. It is now specified in all applications formerly calling for Type 303 stainless steel at this plant.

Cut *your* production costs! Order New Uniloy 303MA at your nearest Universal-Cyclops steel service center or sales office. Ask for your copy of the "Uniloy 303MA" brochure.

*U.S. PATENT NO. 2,900,250

UNIVERSAL CYCLOPS
UC STEEL
STEEL CORPORATION
EXECUTIVE OFFICES: BRIDGEVILLE, PA.

STAINLESS STEELS / TOOL STEELS / HIGH TEMPERATURE AND REFRACTORY METALS

TIPS FROM A ROLL MAKER'S NOTEBOOK

MACKINTOSH-HEMPHILL DIVISION, E. W. BLISS COMPANY, Pittsburgh 3, Pennsylvania

Cast mill rolls • cinder pots • rotary tube straighteners • end-thrust bearings • heavy-duty lathes • steel and special alloy castings

How to get the most from cogging hammer dies

For many years, we have supplied cast steel dies that are used for cogging ingots into billets and blooms. During this time, we've been aware of the variation in the service life of identical dies used in different plants under apparently similar conditions. As a result, we have tried to find out the cause.

HERE IS WHAT WE HAVE FOUND

Tricks of fitting spell the difference: Each blow of a drop hammer generates tremendous pressure at the moment of impact. For a 5-ton hammer, this pressure could approximate 10,000 tons. Hence, it is vitally important that the faces of the top and bottom dies be exactly parallel. Equally important is close fit of the dies in the top and bottom die holders.

The hot forming department at Universal-Cyclops' Titusville, Pa., plant gets the longest cogging hammer die life that we know of. Thus, a close look at Titusville's practice should be helpful.

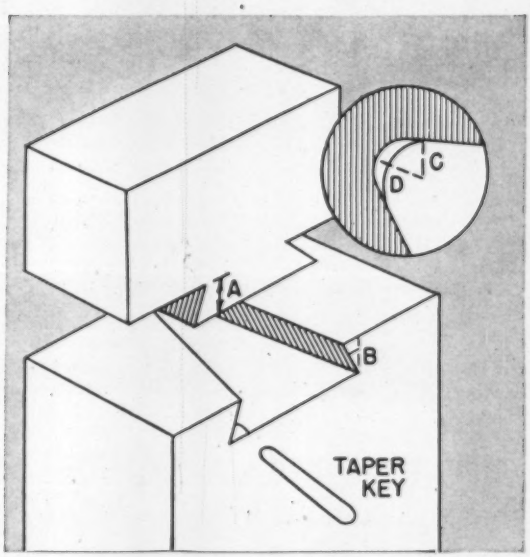
You can't argue with success: Let us take a specific case — the adjustment and fit of the bottom die in the sow block of one of Universal-Cyclops' 5-ton hammers (all remarks on tolerances apply equally to the fit of the top die in its holder).

Starting with new dies, the face of the shank key is machined to zero, and the wings are machined as close to the 3" setback as possible. Actual tolerance limits here are 3" min. and 3.004" max., making the die key face at most .004" high.

After extended use, the 16,000-pound sow block may shift slightly, causing the dies to go out of parallel as much as ⅝". Before removal for redressing, parallelism of the dies is checked, and if necessary, the face of the bottom die is machined to bring it into parallel with the top die.

Avoid weak points: Close seating tolerances are not the only prerequisites for maximum die life. Areas of potential structural weakness must be carefully avoided. For example, the fillet radius at the corner where the die shank key joins the die wing and the mating radius in the die holder should leave a space enough to sight between the die and holder. Universal-Cyclops uses ⅜" and ½" as these complimentary radii.

The angle of the shank key from the vertical is purposely kept to 7° for best performance. The greater the angle, the more the shearing effect as the relatively light die rebounds from the heavy anvil after each blow, tending to tear the shank.



Dimension A is 3.000" + .004". Angle B should be held to 7° from the vertical. Radius C is ⅜"; Radius D is ½".

To guard against shank retaining keys breaking off, Universal-Cyclops blues the key with chalk before seating it, and then checks it for uniform contact along the angled and tapered faces. Moreover, care is taken to make sure that the key isn't so high that it touches the wing of the die.

Choice of dies: Mack-Hemp "Red Top" cast steel dies are a development of our long experience in slabbing and blooming mill rolls. Their remarkable resistance to peening, "mushing," spalling and other varieties of wear has been proven time and again in open die forging work. If you start with Red Top dies and then follow the suggestions made above, we guarantee improved performance from your cogging hammers.

For help with your specific problem, whether it involves forging dies or mill rolls, simply write or telephone us at HE 1-3000, or send for our free Hammer Die Bulletin.

MACKINTOSH-HEMPHILL

You get more tonnage from "the rolls with the Striped Red Wabblers"

Division of E. W. BLISS COMPANY

Presses, Rolling Mills, Special Machinery

BETTER PROFITS THROUGH BETTER TOOLING WITH CARBOLOY® CARBIDE PLUSES

CARBOLOY®, THE METALLIC VITAMIN FOR INDUSTRY

Carboloy cemented carbide disposable inserts . . . the metallic vitamins of industry . . . demonstrate their superior quality in the bonus work output per cutting edge. Multiple reasons explain their efficiency. One important factor is pre-honing a precise radius around the complete perimeter of the cutting edges. This factory process is designed to reduce chipping and increase predictable tool life. Worthwhile savings in time and money result.

For steel-cutting applications, Carboloy inserts are available pre-honed. All Series 78 grades for normal steel cutting come pre-honed. The 300 Series for heavy-duty applications are available pre-honed, precision-ground or utility-ground. Like to know more about these features, designed to help you gain *better profits through better tooling?* Call your Authorized Carboloy Distributor or write: *Metallurgical Products Department of General Electric Company, 11153 E. 8 Mile Blvd., Detroit 32, Michigan.*

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METALLURGICAL PRODUCTS DEPARTMENT

GENERAL ELECTRIC

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For every job . . . an Ansco X-ray product

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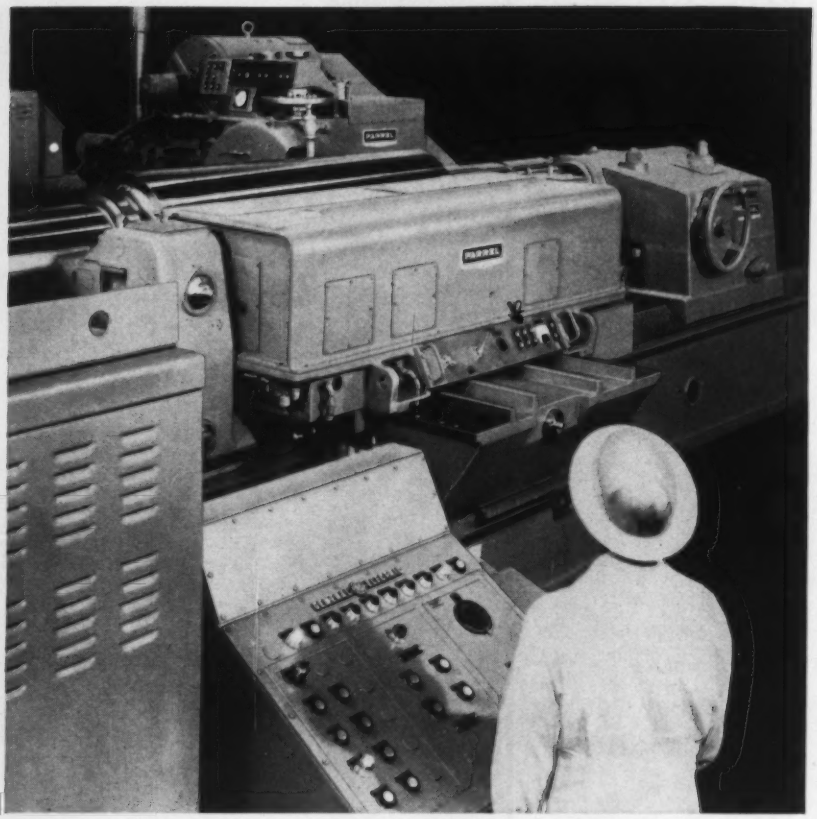

View of Farrel 60" heavy-duty, fully automated roll grinder, showing control console in foreground and probe table beyond.

NOW

your roll grinding can be AUTOMATED

(completely or partially)

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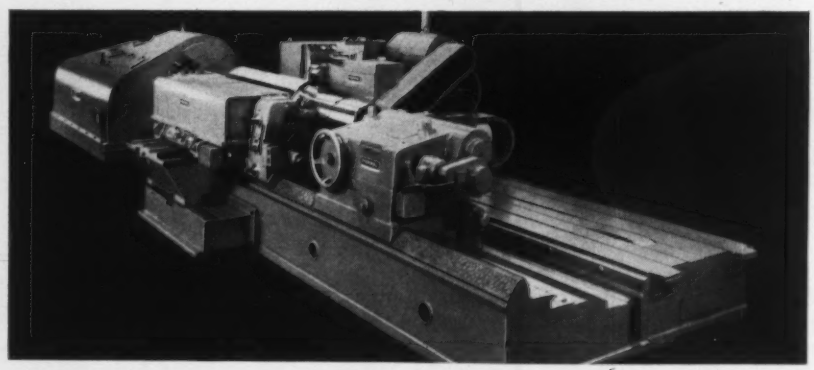

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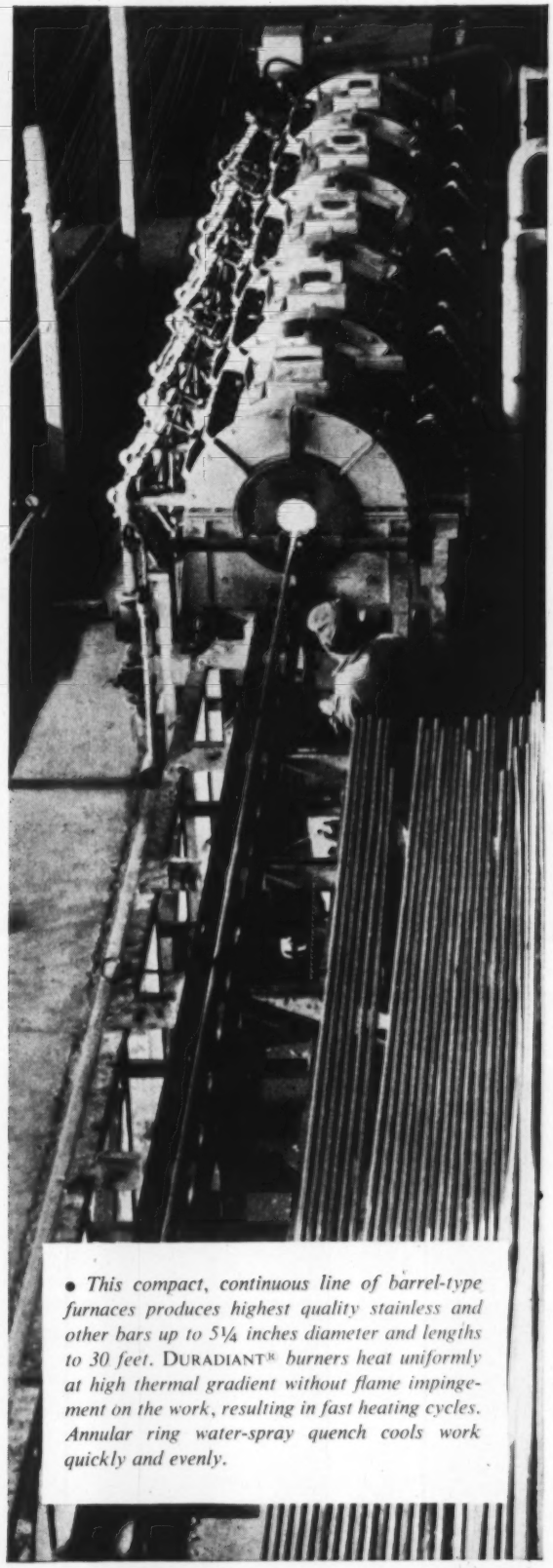

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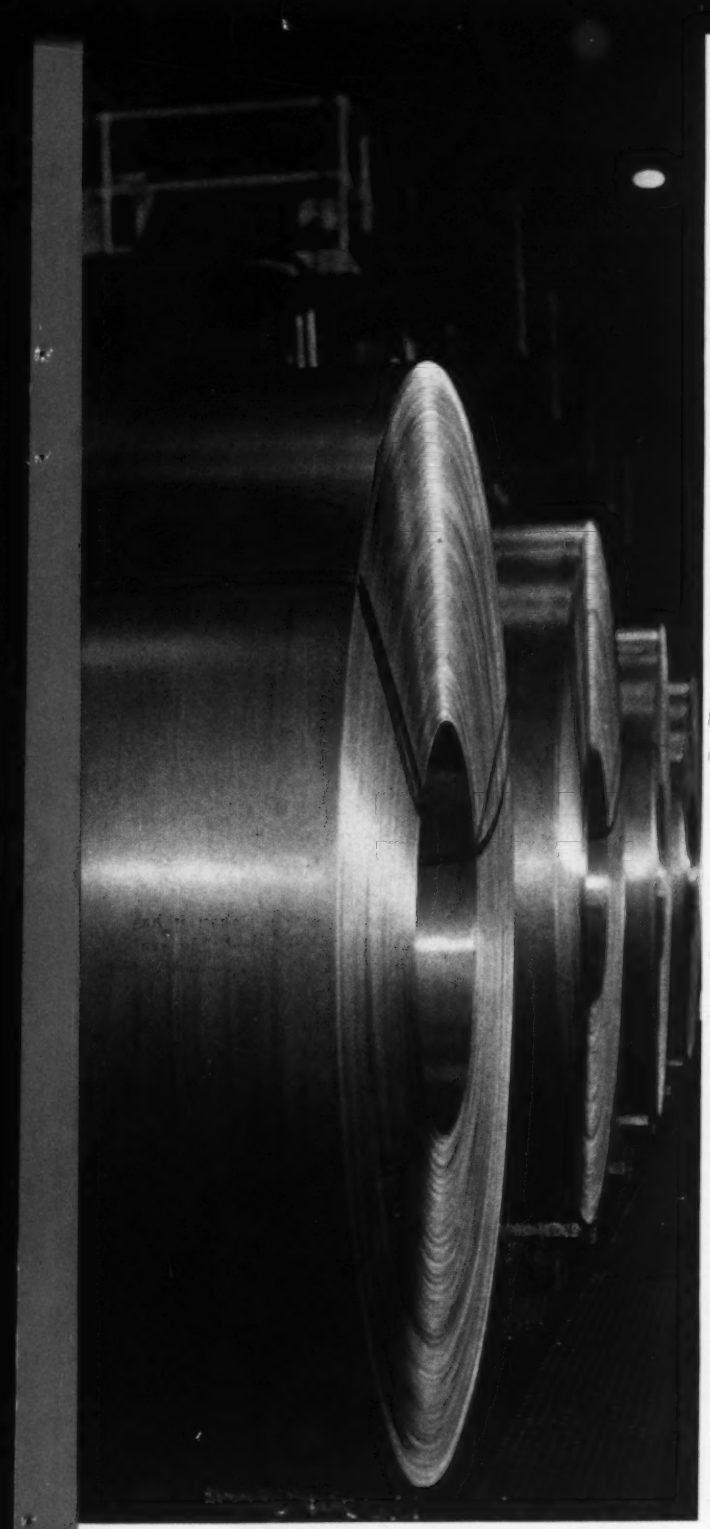

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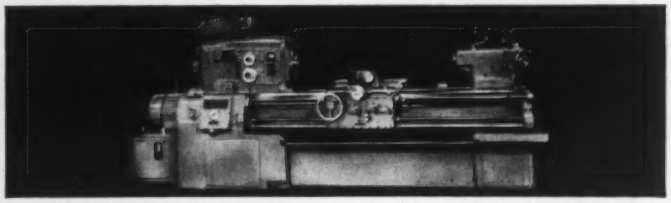

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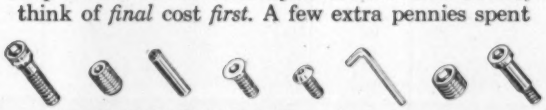

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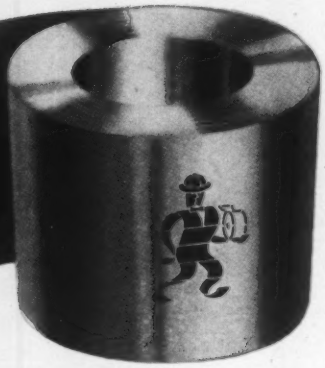

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Metalworking Newsfront 6

THE IMPORT CAR MARKET this year is expected to make sales of 370,000 units. This is the estimate of Peter Nunez, sales manager of Chrysler's U.S. Simca Sales Co. A continuing strong market is forecast for 1962-63. The market should level at 300,000 units, says the Chrysler executive. Import car sales reached a peak of 614,000 in 1959; dropped down to 500,000 in 1960.

HOT COMPETITION IN THE CONTAINER MARKET is getting even hotter. Foil-lined spiral-wound fiber containers are being aimed at the oil market. A "high level of acceptance" is reported by one big oil container buyer. Next likely targets: Paints, chemicals, coffee.

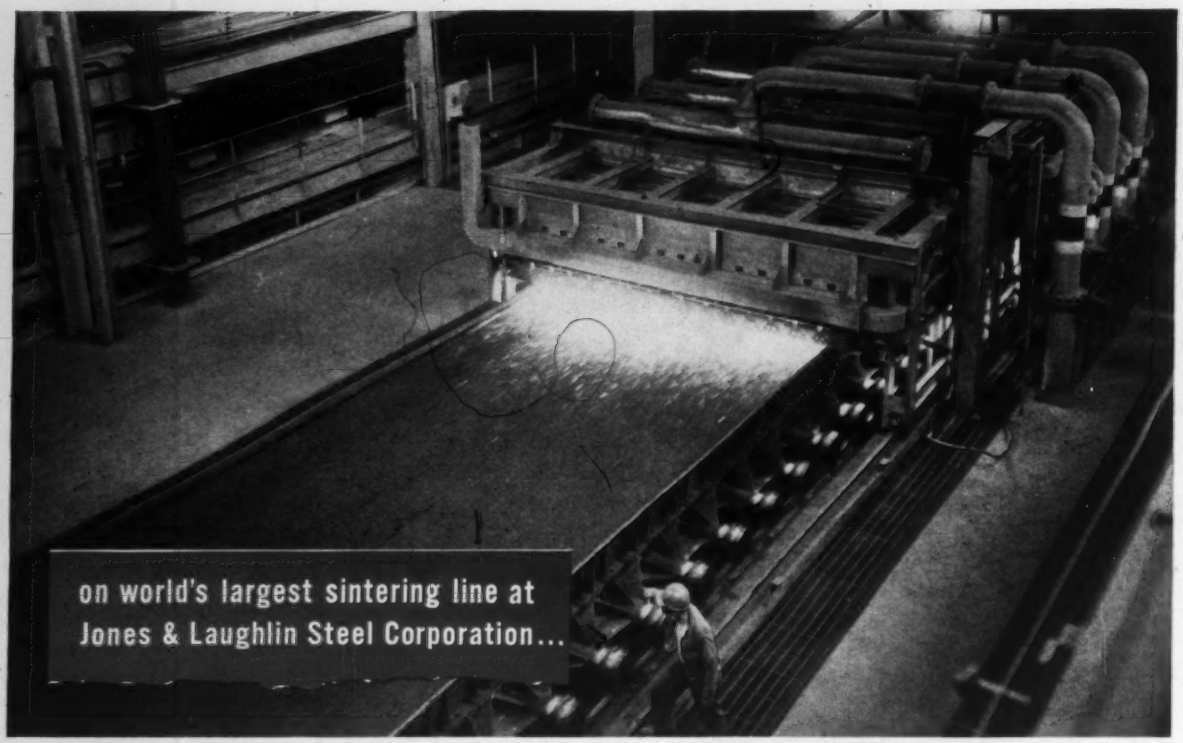
AN IMPROVING RATE OF RESIDENTIAL CONSTRUCTION for the coming year is predicted by the investment service, Value Line. Company analysts foresee a "better marketing climate" for most building materials compared to the last 18 months.

BUYING POWER of factory workers declined in July. The decline stopped a 4-month rise in buying power. Slightly higher earnings and a longer workweek pushed up buying power, but the rise in consumer prices offset the gains. Rising costs of services continue to be the big element in price gains. Since 1956, service costs have gone up 17 pct. Consumer durables prices have gone up 8 pct in the same period.

METALWORKING MARKET FORECASTERS from three industries met recently to compare notes. After a hard forward look at the first half of 1962, they came up with an average figure that would make sales for that period 25 pct over the same 1961 period.

COMMUNICATIONS EQUIPMENT is headed for another record-breaking sales year, according to a Commerce Dept. midyear review. Sales for the year are estimated at $3.20 billion, up from $2.93 billion last year. The industry makes more than one-quarter million different pieces of equipment and parts for telephone, telegraph, and international radio and cable companies.

WELDING SUPPLY SALES for the first half of the year were up 4 pct over sales for the same period last year. This was indicated in a survey of members of the National Welding Supply Assn.



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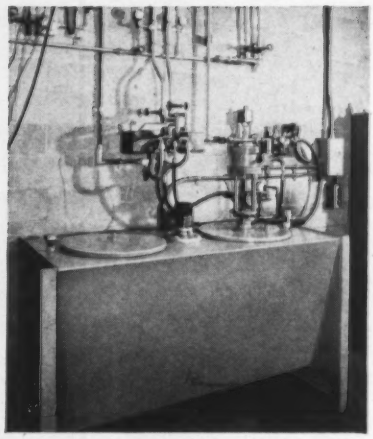

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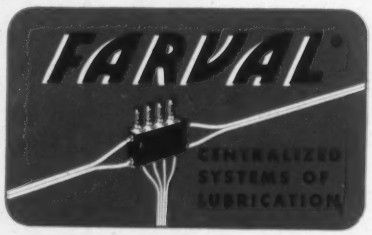

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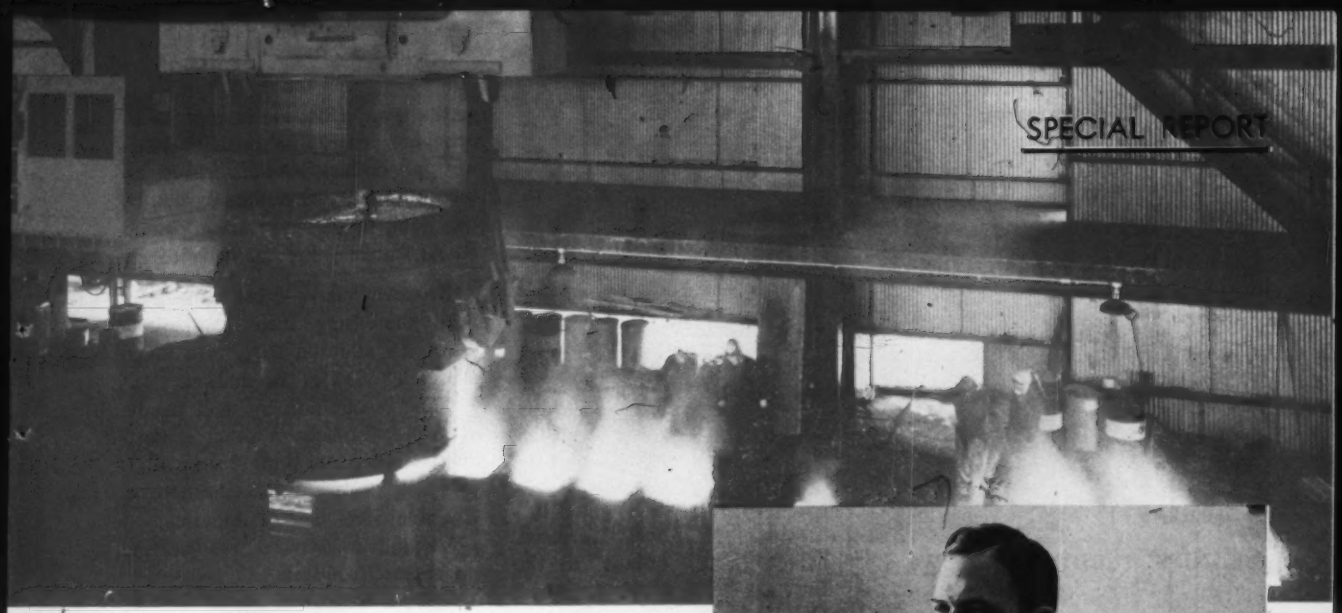

Steelmakers Reply to Market Challenges

By G. J. McManus

■ Armed with a bundle of new products, steel mills have come charging out of their recession.

The mills have lightened, brightened and widened product lines for all markets. They are hitting competition with thin tinplate, hollow structurals, bright annealed stainless, plastic coated pipe, spangle-free galvanized and a raft of others.

This explosion in product technology is shooting off in so many directions it's hard to say exactly what's happening and why. However, basic causes and effects look something like this:

1. Pressure for faster change is coming from sharper and broader competition.

2. Competitive drives are shifting the emphasis in steel management and bringing a stepped-up search for new ideas.

3. Up until now, new products have represented a replacing of steel by steel to a large extent; improvements have tended to reduce steel tonnage and not always with dollar compensation.

4. The broad trend toward greater value has worked

ALLEGHENY LUDLUM'S HARDING: "Emphasis will be on solving metals problems rather than selling steel."

PITTSBURGH STEEL'S LAUTERBACH: "We've got 150 million tons of steel to sell."

INLAND'S BUDDINGTON: "We are indebted most, perhaps, to the fellows who have done miracles with the blast furnaces and openhearths."

CRUCIBLE'S DAY: "Recognition by steel people of competition from other materials is a very real thing. I shudder to think how few customers we would have if we still had only 1940 steels."

in many different ways for different products. There are moves toward specialization and toward standardization, toward higher alloys, and toward lower alloys. The mills are offering more coated steels; they have developed surfaces that require less coating.

Over a four year period, steel mills have averaged under 70 pct of capacity. The industry has seen its traditional export surplus of 2-million tons wiped out. It has watched the aggressive pushes of aluminum, plastics and other materials. The mills have come to realize they must do something to check and reverse these trends.

More for R and D—"Current market conditions have spurred research and development activities . . . to save existing markets and to develop new ones," says J. H. Faunce, Jr., director of market and commercial development, Lukens Steel Co.

"Our research program emphasizes tailor-made steels which will give the customer an optimum of steel for each application. We are getting away from the idea of measuring our progress in tonnage; rather we use dollars—dollars saved by the customers and dollars earned by the company," says Alan Wood's R. A. Lubker, director of research.

Broader View—Steel mills have been increasing their competitive effort. In addition they have taken a broader view of the market.

"The recognition by steel people of competition from other materials, is a very real thing," says M. J. Day, vice president, commercial, Crucible Steel Co. of America.

Virtually all mills are beefing up research budgets.

Inland Steel Co. looks for its research staff to grow at the rate of 10 pct a year. Although its present laboratories were built in 1954, Inland is thinking of new construction "because it is now obvious that they will be inadequate within a few years."

Search for New Products — As a percentage of its sales dollar, Allegheny Ludlum Steel Corp. has tripled research spending over the past few years. Crucible's research spending and personnel have increased 20 times since 1955. One of the earliest to recognize the value of research, Armco Steel Corp. is spending three and a half times more than it did 10 years ago.

Bethlehem Steel Co. recently built a big new research center. Bethlehem looks for its research spending to at least triple in the next 10 years. Wheeling Steel Corp., Sharon Steel Corp., Lukens Steel . . . all the mills are research minded today.

"There is growing realization that the inherent qualities of steel have not been fully developed," says C. H. H. Weikel, Bethlehem's vice president in charge of research.

Market-Oriented—Mills are increasing research volume and they are pointing programs towards markets.

"Current market conditions have made steel research more market-oriented and steel production more quality conscious," says J. L. Ham-

ilton, Jr., executive vice president and general manager of sales, Granite City Steel Co.

The broad impact of steel research on steel markets is almost impossible to calculate. Taking a narrow view, steel has been competing with itself in most product improvements. If 1955 steels were being used today, says one analyst, domestic consumption would be 3 to 4 million tons greater. This compares with a loss to competitive materials estimated at 1 million tons.

Customer Savings—There are numerous examples of how a ton of steel goes further today. Citrus cans made of thin tinplate take 25 pct less steel than conventional cans. Aluminized steels double auto muffler life. Using improved drawing steels, auto plants are forming differential ring gears from 30 pct less metal.

But the mills say you can't just look at these immediate effects. There is no way of knowing how much greater the competitive loss would have been without better steels. And no final reckoning can be made without knowing what new markets will be opened by the steels.

Tons for Dollars—Are the mills trading tons for dollars, by selling less steel but more expensive steel?

Overall statistics indicate that any tonnage losses have not been offset by a swing to higher price steels. Carbon steel accounted for 92.4 pct of total shipments in 1948; last year, carbon grades were 93 pct. Stainless shipments were 0.8 pct of the total in 1960; alloy output was 6.2 pct. All these figures have been remarkably constant over the past 13 years.

The reason for this constancy is fairly obvious. Steel's spurt in product technology has not been simply a question of bringing out a few super grades at fancy prices. The improvement has been across the board, taking in the cheapest as well as the costliest grades. The one consistent trend in the whole picture is toward fewer steel dollars per unit of end product.

"The value you get for your dollar in steel today is far greater than what you get in the market place," says Mr. Day of Crucible.

Wide Upgrading—In some cases, customers are stretching their dollars by going to more expensive but stronger steels. Use of alloy grades in place of carbon steel has brought some dramatic and highly publicized weight savings.

However, there has been displacement in both directions. The upgrading of carbon steel has been gradual and quiet but it has had tremendous commercial impact.

All the tonnage products are going through the same process of steady upgrading. Last year, a new specification raised the maximum yield strength for carbon structurals to 36,000 psi. Eleven new shapes have been introduced in the past year for wide flange beams. United States Steel Corp. recently came out with a line of hollow structurals. Light plate in coils is reducing handling and setup costs for fabricators. Larger sheet coils are having the same effect.

Customer Demands Reflected—Some of the most significant changes involve very obscure shades of quality. Auto plants have been pushing for a smoother surface on cold rolled sheets. With new paints, the auto people feel they can get by with just one coat if they start with the right surface.

As a result, the mills have developed and the auto people have adopted what is called a light matte finish. To assure this quality, nearly all the mills have installed new surface testers, employing brush analyzers and electronic computers. No price extra is being charged for the smoother finish.

Other Product Improvement—Open coil annealing for enameling iron has the same effect of giving the users a surface that requires less coating.

Use of extra strength steels is being extended to almost all markets and products. To combat foreign and domestic competition, the

LUKENS' FAUNCE: "Current market conditions have spurred research and development to save existing markets and to develop new ones."

GRANITE CITY'S HAMILTON: "Thin tinplate is not just a defensive weapon against aluminum cans. It's an excellent possibility for other markets."

large mills are offering reinforcing bars with yield strengths up to 90,000 psi. High tensile wire is being made with new drawing techniques and new compositions. Quenched and tempered structural shapes were introduced by U. S. Steel this year.

Linepipe mills now go up to yield strengths of 60,000 psi. To drill wells five miles down, oil producers are using seamless rated at 135,000 psi. Buttress threads give slim joints and more usable well area.

Greater Yields—In both the low alloy and full alloy fields, there is a constant widening of strength bands. New columbium-bearing steels go up to 60,000 psi. Makers of quenched and tempered alloys are pushing well over 100,000 psi. In all these moves, the general principle is that strength units are supplied at a low price.

". . . increases of 29 to 43 pct in yield strength can be obtained with cost increases of 10 to 29 pct," says sales vice president R. M. Buddington, referring to Inland Steel's columbium bearing steel.

No product area has seen more recent action than the coated and clad steels. Two years ago Armco Steel had two basic grades of galvanized.

"Today, we are capable of supplying at least 16 variations . . ." says W. B. Quail, vice president—distribution.

Galvanized Story—Using continuous coating methods and special finishing techniques, galvanizers have come up with a product that will take mass production forming and can be used in a wide range of decorative and functional uses. Mr. Buddington of Inland estimates two-thirds of the galvanized tonnage is now going into manufactured items.

Expansion figures show just how fast the galvanized market is growing. The mills are well on their way to adding 1.3 million tons of new capacity, yet all producers are solidly booked.

Thin Tinplate—Thin tinplate is probably the flashiest new product in the steel picture. It is seen strengthening steel's position in this market against competitive materials. It could also be important elsewhere.

"Thin tinplate is not just a defensive weapon against aluminum in tin cans," says J. L. Hamilton of Granite City. ". . . it is an excellent possibility for other markets . . . disposable baking cans and trays, for frozen dinners, detergent cans, paint cans, etc."

Granite City is using a big new Sendzimir mill to roll tinplate and other products down to very thin gages.

In the linepipe market, coatings have had a revolutionary impact. Plastic tape, coal tar and now extruded plastic coatings are being used extensively on the outer surfaces of small diameter pipe.

Specialty Steels—There is considerable interest in clad steels but progress has been limited. Copperweld Steel Co. is using a cladding technique for an aluminum clad, steel reinforced cable. This method gives more efficient conductivity and high resistance to corrosion, says Copperweld.

Among the specialty steels, there are numerous opposing trends. Tool steel producers have been attempting to standardize their wide scattering of brands.

"The more applications a given grade will suffice, the less cost there is in inventory," says Crucible's Day. He points out it is the customer who benefits ultimately from the savings of standardization.

More Specialization — In the stainless market, the current trend seems to be toward specialization.

"There is very much of a tendency toward products tailored to particular end uses," says R. L. Harding, director of marketing at Allegheny Ludlum.

The new grades for automotive trim illustrate this thinking. And producers are now looking for ways to exploit the functional properties of stainless to a greater extent. Allegheny Ludlum is producing its new muffler grade very much like a tonnage steel. Stainless men think there may be other applications where this notion will work.

However, Mr. Day feels some of the new stainless grades represent a groping for a new standard rather than a trend toward specialization. He feels the automotive people will settle on one or two grades.

"They are the authors of standardization," he points out.

The whole outlook is summed up tersely by R. E. Lauterbach, vice president, sales, Pittsburgh Steel Co.

"We have 150 million tons to sell," he says.

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Steel Men Hot Under the Collar At President's Price Attack

Although White House pressure against steel price increases was expected, Kennedy's blast was considered below the belt.

Three years of no price increases is considered enough restraint by most executives.
By Tom Campbell

KENNEDY: Asks restraint.

HOMER: Defends the record.

■ Steel men were still stunned this week from their treatment at the hands of the President of the United States. Mr. Kennedy last week in a subtle and "Do you still beat your wife?" type of letter had asked steel officials not to raise prices.

The White House theory was that steel companies were going to raise prices after Oct. 1 when a 14¢ an hour increase in employment costs takes effect. (For the past 18 months, The IRON AGE has continually suggested that there would be no price increase and placed the odds against such a move even this year.)

The Reaction—Steel people hesitated to strike back at some of the material in the President's letter. Most believed the statistics were a setup to prove one point alone—what the White House wanted to prove. Some steel executives suggested that the figures were accurate as far as they went; it was the way they were used which drew blood.

When it was stated that steel prices had advanced 120 pct from 1947 to 1958, wrath was unbounded at the failure of the President and his advisors to check the status of steel prices in the 1940's. Old timers recall that in the 1930's, steel prices were among the lowest in this century.

This resulted from a blood-letting spate of price cutting which extended from 1932 to 1939. Thus, it is argued that the few changes from 1940 (when prices were frozen by the White House) to 1947, which was used as a base year, left steel prices so low that the industry was in danger of financial chaos.

Catching Up—The higher rate of steel price advances compared with regular wholesale price changes was due mostly to "catching up" rather than to any attempt to gouge the consumer. The industry was hard up for money to expand its capacity, to repair its plants and equipment after a depression lasting from 1930 to 1939 and a fast war-time operation race from 1940 to 1946.

But that is past history. Most steel officials were frustrated, miffed and angry because of the power swung by Mr. Kennedy. That it was a grand slam in timing and letter-writing is conceded by both sides.

Homer Replies — Arthur B. Homer, chairman of Bethlehem Steel, was the first to reply. In a letter early this week, Mr. Homer contended "it is clear that neither steel nor any other single industry has the power by itself to halt inflation if the other prices contributing to inflation are allowed to go unchecked."

He said "the present squeeze on profit margins has weakened our steel industry's ability to remain sound. . . . " But his principal point was calling attention to the industry's not increasing prices for over three years, a period in which employment costs have risen substantially.

White House in Charge? — The most serious minded steel officials —whose tempers remain below boiling—were worrying about the effect of trying to run the steel industry from the White House. Nor were they mollified by Mr. Kennedy's implication that the union's chance to show its restraint and patriotism would come if steel did not raise prices. Most union people and management believe that this part of the President's letter was the well-

What Kennedy Asks of Steel

In his appeal to steel industry leaders to hold present price levels, President Kennedy called attention to their demonstrated will "to halt the price-wage spiral in steel."

But after pointing out steel prices have been stable since mid-1958, he nevertheless warned increases now might force the government into "restrictive monetary and fiscal measures which would retard recovery."

Twelve Letters—Here are highlights of the President's letter which went to the heads of Armco Steel Corp., Bethlehem Steel Co., Colorado Fuel & Iron Corp., Inland Steel Co., Jones and Laughlin Steel Co., Kaiser Steel Corp., McLouth Steel Corp., National Steel Corp., Republic Steel Corp., United States Steel Corp., Wheeling Steel Corp., and Youngstown Sheet & Tube Co.:

"I am taking this means of communicating to you, and to the chief executive officers of eleven other steel companies, my concern for stability of steel prices.

"In the years preceding 1958, sharply rising steel prices and steel wages provided much of the impetus to a damaging inflation in the American economy. . . . Steel wage rates also rose rapidly, causing employment costs per ton to steel to rise by about 85 pct. . . ."

Stable Since '58—"Since 1958, our price performance has substantially improved. Steel prices have been stable since 1958, as has the Wholesale Price Index. . . .

"The record of price stability was purchased, however, at the cost of persistent unemployment and underutilized productive capacity.

"I recognize, too, that the steel industry, by absorbing increases in employment costs since 1958, has demonstrated a will to halt the price-wage spiral in steel.

"If the industry were now to forego a price increase, it would enter collective bargaining negotiations next year with a record of three and a half years of price stability.

"It would clearly then be the turn of the labor representatives to limit wage rate demands to a level consistent with continued price stability. . . ."

known "carrot" held out to the steel officials.

Most steel officials, who are still smarting privately over the enforced steel settlement into which they were led by the Eisenhower Administration, were in no mood to respect restraint in labor negotiations next year. Most thought the use of the words "limit wage rate demands to a level consistent with price stability" would naturally be interpreted by Dave McDonald, United Steelworkers chief, as meaning a repeat of the 3-year, 41¢-an-hour package they got in early 1960. He has maintained all along that the raises were possible without any price increase. So it is a foregone conclusion how he has interpreted the President's remarks on the Union's "limitations."

McDonald Waits—Mr. McDonald has refused to be drawn into any arguments about Mr. Kennedy's letter. He claims a lot of water will go over the bridge before the next steel negotiations. This is the labor understatement of the year, particularly in view of Walter Reuther's success in carving out a modified annual wage—something the steel union had set its cap for back in the days of the late Phillip Murray.

The full-dress rebuttal by Senator Everett Dirksen and his group went through the same hassle, rebuttal and chewing match which most steel officials hope to steer clear of with Mr. Kennedy. Senator Dirksen pleaded the industry's side with complicity and with this daring argument—from the steel side anyway: Setting steel prices in the White House or in the Senate was no way to run the steel industry.

Restraint on the Record—In fact, having foregone price increases in the face of a 28¢ an hour boost in wage costs so far, steel men had believed—up to the time they got their letter—that they had heeded not only the national interest but competition.

Possibly the stumbling block to any kind of communication between Mr. Kennedy and the steel leaders is the cavalier way in which the steel study of the Council of Economic Advisors was adopted as if it were the last word in running any steel company. Most steel companies have different costs. Some of the bigger units sell non-steel items which affect their steel cost. Still other steel firms have more money and better equipment and, hence, more volume to help them absorb at least part of the wage cost increase.

The Others—Entirely forgotten in the haste to write to the Big 12 were the myriad of the steel firms which are classed either as middle-sized or small-sized. Most of them have the same wage rates and fringe as the bigger firms; but their costs are often higher than the bigger units because their equipment is often older, their freight absorption is greater, their product mix may not be of the best, and they have a far harder time borrowing money — if they can borrow it at all.

Even some of the 12 companies reached by Mr. Kennedy are certainly not in the group with "the first six" of the industry. While it may have been an honor to be included in this select circle at which Mr. Kennedy directed his "persuasion," some feel it is a questionable and empty consolation—in view of their costs.

Whether or not steel prices advance after Oct. 1 is anyone's guess. It is our guess that there are about 2 chances in 10 for a small, modified price advancement compared with about 4 chances in 10 before the blast, attack and letterwriting, one-two-three punch.

Does New Contract Mean Peace?

GM Still Faces Possible Shutdown Over Local Issues

GM came through with a fat package for the UAW last week. But it didn't solve everything.

The union insisted that a log-jam of 15,000 grievances be settled at the local level, too.

■ Walter P. Reuther, president of the United Auto Workers Union, has made up for the licking he took at the hands of the Big Three automakers in 1958.

The new contract worked out with General Motors Corp. last week doesn't give a shorter workweek or salaries for blue-collar workers. But it will be worth about 65¢ to 70¢ an hour to workers over the three years the contract is to run—exclusive of cost-of-living provisions.

And it moves the union a couple of steps closer to its goal of a "Guaranteed Annual Wage."

It provides about the same benefits—without "progress sharing"—as the contract signed by American Motors Corp. earlier.

Wage Increases—Key provisions of the new contract:

1. Annual improvement factor is retained. One change: Two cents of the 1961 increase will go toward improved hospital-medical coverage. Net effect will be a 10¢-to-12¢ per hour pay hike, as the workers now contribute about 7¢ per hour for such coverage, and the improvement factor averages about 7¢ an hour.

2. Cost-of-living allowance is retained; 12¢ of the present 17¢ allowance will be transferred to base wage rate. One change: A 1¢ boost, due Sept. 4, will instead be used toward payment of increased pensions and half the cost of hospital-medical coverage for pensioners.

Short Workweek Pay—3. Short workweek benefit paying 65 pct of the wage for difference between hours worked and 40 hours if the short workweek is "scheduled"; if "unscheduled," payment drops to 50 pct for hours not worked.

4. Maximum Supplemental Unemployment Benefits are raised to $40 from $30 and may be paid up to 52 weeks instead of 26 or 39.

Moving Allowance—5. Separation payments will be increased 25 pct.

6. Pension payments for future retirees will be increased to $2.80 per month for each year worked—up from $2.50.

7. Moving allowance of up to $580, depending on distance of the move and worker's marital status, will be paid when there is a shift in major operations.

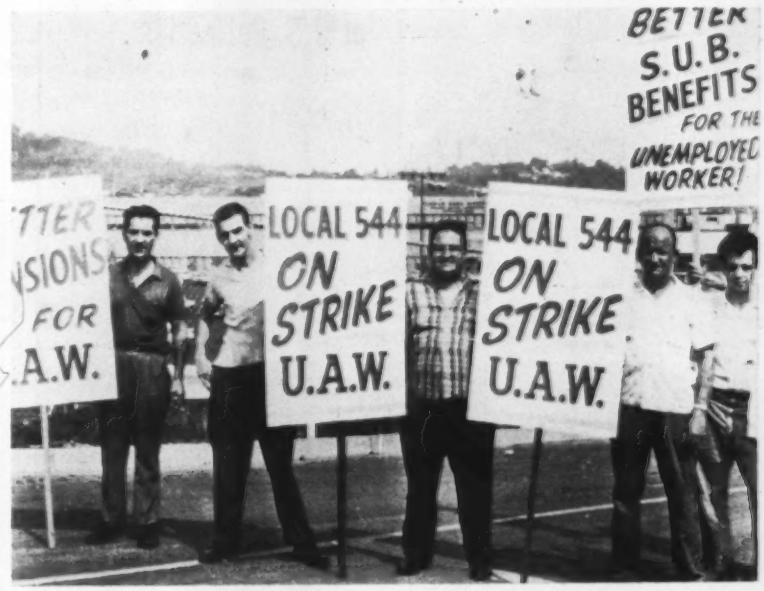
8. Other fringe benefits were also improved.

Free to Strike—There can be little doubt that Ford Motor Co. and Chrysler Corp. will go along with the new package. Since 1958 the Big Three have followed "parallel bargaining" and keep each other informed.

But settlement in economic areas is not an automatic signal for peace. As late as Monday morning GM still faced the possibility of a major shut down.

Over the weekend Mr. Reuther told union locals they would be free to strike over local issues at 10 a.m. Monday if grievances at individual plants were not cleaned up by then. Minutes before the deadline, only 30 of GM's 130 plants had settled.

"Open Invitation"—The company's chief negotiator, vice president Louis G. Seaton, called it an "open invitation to hit the bricks." At the start of contract talks at the end of June the union filed 19,000 grievances with GM. When the announcement came, only 4000 had been settled. And the auto company went into last weekend with several plants on strike.



HIT THE BRICKS: Members of UAW Local 544 picket key GM plant at Pittsburgh. Continued shutdown could cause closing of other plants.

Is Copper Set for Rebound?

Strike Settled; Supply Looks Ample for Stronger Demand

A week ago, copper was on allocation by some U. S. producers.

Although stocks of copper are low, they should be adequate to handle demand this year.
By F. J. Starin

■ The copper market has proved its traditional volatility. Last week, several producers had placed their customers on allocations. This week, they talk about lifting allocations when ore begins to move from Chile.

On the strength of a good outlook for ample ore supplies and a strong domestic demand, the U. S. copper industry now faces prospects of a good fourth quarter and a good business outlook into 1962.

This focuses attention on copper prices, now at 31¢ per lb for both producers' copper and custom smelters'. While strikes were on in Chile and at U. S. sources, the outlook indicated higher prices. Now, the prices have the feeling of stability, unless other factors interrupt the supply of ore.

Situation in Chile—The copper strikes in Chile, which had been a major threat on the copper supply, were resolved. Beginning this week, all major mines will again be operating.

Although one top copper seller estimates the lost production at about 50,000 tons, the strikes never did have a full impact on the market. Here's how he explains it:

The strikes began in August, when business was only starting to pick up. By the time copper buyers realized real trouble might be brewing, there was time for only a brief flurry of hedging before the Chilean strikes were settled.

On Allocation — Several companies, not all with Chilean interests, reported allocations. In one company it amounted to a cut in orders of about 20 pct. In another it meant merely that the company would ship based on past performance. They say no one was cut back. Customers were merely prevented from hedging.

Europe, and particularly the London Metals Exchange, never really reacted to the Chilean strikes because users there didn't receive the impact. Ships are still under steam to Europe with copper made before the strike.

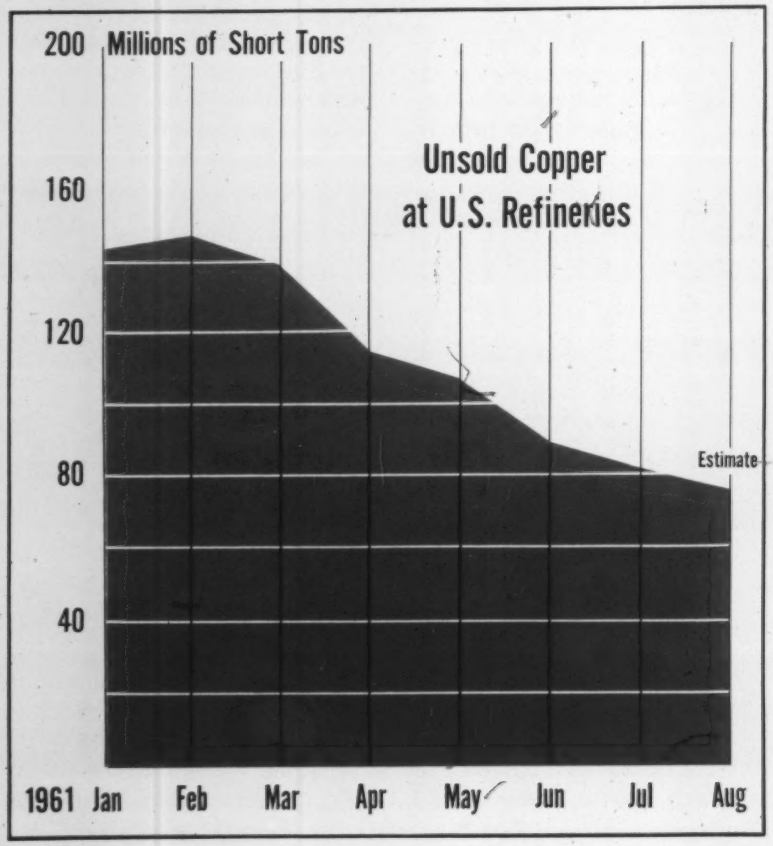
European buyers were put on allocation. But inventories of copper are high, so no one was squeezed.

Here at Home—Near the end of last week, Kennecott settled a three week strike of electrical workers at the Utah Div.

The strike started on Aug. 17. It forced shutdowns at one operation after another, finally idling some 6000 men.

With strike headaches now out of the way, copper people are optimistic about the last quarter. Business is picking up very well right down the line from mine to fabricator.

Copper Stocks Continue to Fall



Books Filling — Several copper sellers report their books are closed for September and inquiries are excellent for October. What little is open for September is largely reserved for expected orders from regular customers.

Brass mills report orders are definitely better. Most mill executives are not yet ready to guess on how overall business this year will compare to 1960. But the president of one company thought it was significant that business was slipping badly at the end of last year, and will almost certainly be on the upsurge at the end of this year.

Stocks Are Low—Despite the definitely better feeling in the market, copper is far from out of the woods. Figures were not available from the Copper Institute on the size of unsold stocks of copper at U. S. refineries at the end of August, but they are probably under 80,000 tons. This would be the sixth consecutive drop in backlogs, and the lowest point for the year.

This is only about 15 to 20 days backlog based on the current rate of shipments to fabricators. This is low, and, in fact, not nearly enough to compensate for any further disturbance of supplies.

Users Are Vulnerable — Simply stated, U. S. copper users are still quite vulnerable. The sales chief of a major copper company said he would like to rebuild stocks at his refineries, but frankly doubted he could this year.

The copper industry is reasonably sure, right now, that the totals for the year will show more than enough supply to meet demand. But the sales vice president of another major copper producer figures it will be late in the quarter before the danger of spot shortages is eliminated.

Inventories of copper buyers in the U. S. are a question mark. Best estimate is that brass mills have good stocks and their customers are low. But copper industry men feel there will be no major inventory building this year and the buying will closely match consumption.

Remodeling Market Attracts Builders

Last year Americans spent over $13 billion on home improvements, a jump of 33 pct since 1958.

More builders enter the market as sales of new homes lag. However, they want more cooperation from suppliers.

■ The home remodeling market is taking on a new look. A huge growth in the field and a slow-moving new home market are drawing big builders into remodeling. And the Housing Act, passed on June 30, promises to give an extra boost to this market. It's now easier to finance a remodeling job than a new house.

Most builders in remodeling work agree building materials manufacturers and appliance makers face new marketing problems in reaching the market.

Attention turned to remodeling this spring when the Census Bureau revealed Americans spent $13 billion for upkeep and improvement of their homes in 1960. In 1958, an estimated $8.7 billion was spent; in 1959, $10.7 billion.

Full-Scale Promotion—The National Association of Home Builders formally acknowledged this market in April when they launched a remodeling department. A survey showed about one-third of their members were already active in the remodeling field. The association is readying a handbook for remodeling contractors to be published later this year. And the national convention of the group, to be held in Chicago in December, is expected to highlight remodeling.

The remodeling market breaks down into three classes, according to NAHB: Additions and alterations, maintenance and repairs, and replacements. Builders see their opportunity in the replacement area. Contractors will likely continue to handle the bulk of the business in the other two classes.

A breakdown of Census Bureau figures shows the replacement market in 1960 ran to $5.5 billion.

D. L. Garrehy, director of the new NAHB remodeling service, told The IRON AGE: "This data indicates the builder potential in this market is about $3 to $7 billion annually."

He points out even if the lower figure of $3 billion is the market, this runs close to 20 pct of present dollar volume spent annually for new housing.

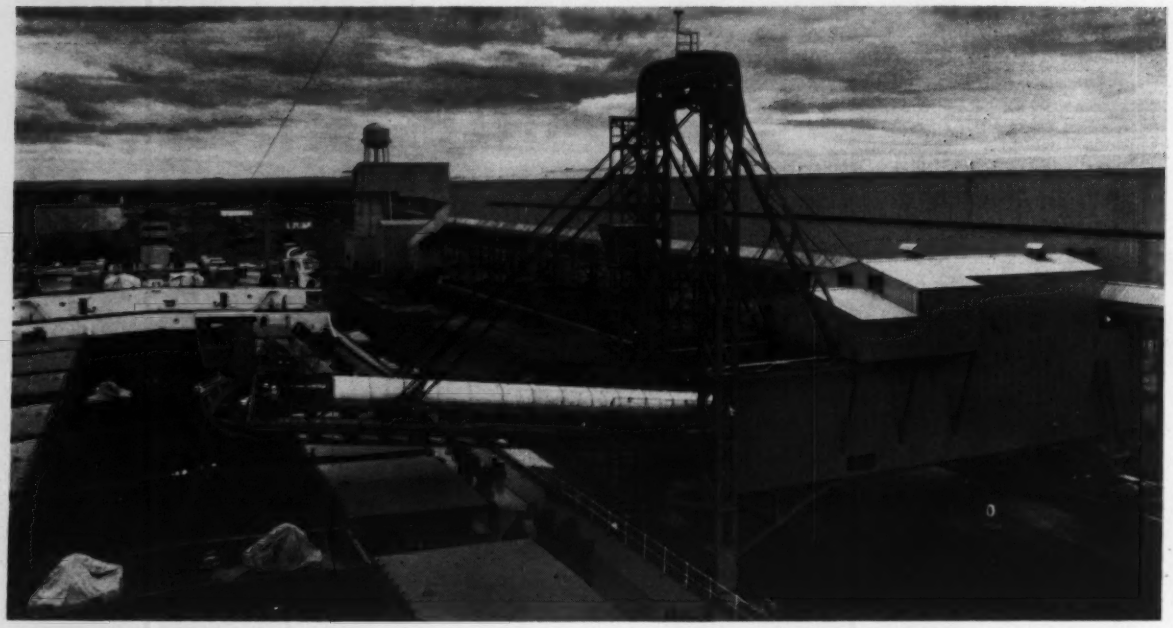
Ready for Appliances—"As far as metalworking's tie-in with the remodeling market," says Mr. Garrehy, "don't underestimate this as a ready-made market for major appliances. For example, take new kitchens—a favorite remodeling target. A real remodel job here can involve anywhere from one to six major appliances."

Mr. Garrehy and others look for appliance manufacturers to work more closely with remodelers. They see a rich field in packaged units and combinations designed and marketed by appliance makers.

"Serious Gap" — Recently, in Washington, the NAHB held a conference to discuss the manufacturers' stake in remodeling.

At the meeting there was wide agreement with the view of Baltimore builder J. Y. Zenitz about the "serious gap in the manufacturers' marketing process" in dealing with remodelers. He said manufacturers "lacked the specialized sales and distribution machinery to handle the large and growing volume of business from remodelers."

First Shipment of New Canadian Ore Heads for U.S.



SHIPLOADER IN ACTION: Iron ore is loaded on ship at rate of 100 tons per minute at U. S. Steel's Quebec Cartier Mining Co. in Canada. This first ore shipment from the new operation was sent to Fairless Works, Morrisville, Pa. Experimental use of the ore is scheduled shortly at the plant.

Kaiser Announces New Facilities

Kaiser Refractories Div., Kaiser Aluminum & Chemical Corp., is planning a $1.6 million facility adjacent to its Moss Landing, Calif. seawater periclase plant. The new facility will be used for the development of advanced refractories.

The company says the addition will be an extension of its basic refractories research program. It will have the capacity to produce commercial quantities of newly developed refractories to laboratory standards, according to Kaiser.

Indian Automaker Gets DLF Loan

Development Loan Fund has signed the agreement for a $7.2 million loan to Premier Automobiles, Ltd., in India.

Premier, one of India's leading automakers, produces Dodge trucks and Fiat autos in its plant near Bombay. Most of the components for these vehicles are made by Premier. But sheet metal parts have been imported from the United Kingdom and Italy in the past.

The loan finances the foreign exchange costs of importing presses, dies, and other equipment from the United States. This equipment will allow Premier to produce its own sheet metal. The move is expected to save India $2 million annually in foreign exchange.

Costa Rican Loan

The World Bank has granted a $3 million loan to the Central Bank of Costa Rica. The loan will be used to assist a program calling for importation of equipment for the development of private industry in Costa Rica.

Chrysler Facility

Chrysler Corp.'s Missile Div. has acquired a 22,000 sq-ft facility in Melbourne, Fla. It will be used to expand engineering, manufacturing, and range support operations in the Cape Canaveral area.

New Barges Ordered

Wheeling Steel Corp. will be buying five new steel barges for its marine operations on the Allegheny and Ohio Rivers. Cost of the project is estimated at around $250,000.

Five older barges will be sold or scrapped. The company's marine department already has 64 barges, 210-ft long; and 24 barges, 140-ft in length. The new barges will fall into the larger category.

Help Coming To Depressed Areas

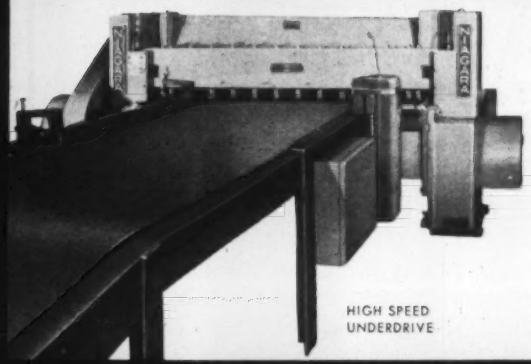
Portions of government contracts of over $10,000 will go to firms in depressed areas, under new procurement regulations.

The new bills, which went into effect the first of this month, call for set-asides in buying by the General Services Administration and other civilian agencies. The funds will buy routine supplies and equipment.

Normal bidding procedures will be followed on the unreserved portions of contracts involved.

UNDERDRIVE

GAP TYPE



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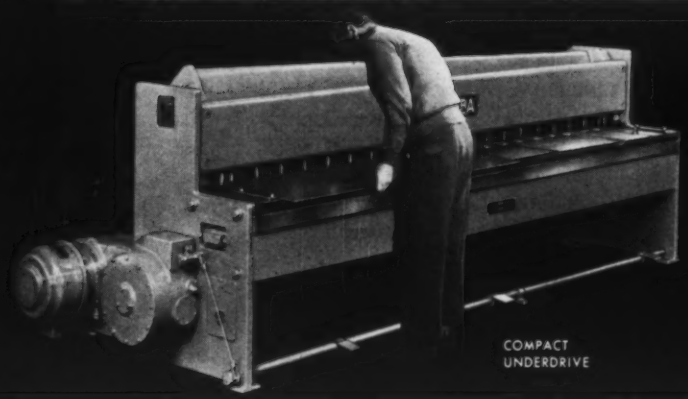

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INDUSTRIAL BRIEFS

Heat Treat — Industrial Heating Equipment Assn. will co-sponsor a symposium on Continuous Furnace Processing. It will be held at the annual convention of the Assn. of Iron & Steel Engineers, September 25, at the Penn-Sheraton Hotel, Pittsburgh.

Safest Ship — National Safety Council has given an award of merit to the Str. Calcite, of Bradley Transportation Line, Michigan Limestone Div., U. S. Steel Corp. It set the longest accident-free record ever recorded by a Great Lakes vessel—1.394 million man-hours without disabling injury during nearly 18 years of operation.

Precision Buy — Miniature Instruments, Inc., Minneapolis, has acquired Metalmasters, a Minneapolis company specializing in high precision machining.

Solder Sale — Alloys Unlimited, Inc., Long Island City, N. Y., is acquiring Bow Solder Products Co., Inc., Brooklyn. New name of the division will be Alloys Unlimited Solder Corp.

Small Ball—KuBar Inc. has been formed with a new plant being built at Cambridge, Mass. It will manufacture a full line of precision miniature ball bearings.

Bigger Business — Business Machines Group, Litton Industries, is acquiring Cole Steel Equipment Co. and its affiliates. Cole has office equipment and business machine plants at York, Pa., and Toronto.

Concrete Move—American Concrete Corp., Chicago, is moving manufacturing facilities and offices to a new plant at Waukegan, Ill.

Michigan Shift — Light Metals Corp. has moved executive offices and production facilities to a new 70,000 sq ft plant at Wyoming, Mich. Trim and hardware production space is double the area of the former unit in Grand Rapids.

Two-in-One—Spencer Chemical Co., Kansas City, has formed one company from two suppliers of flexible packaging materials it recently acquired. United are Flexicraft Industries, Inc., New York City, and Wrapture, Inc., Flushing, N. Y. It will be known as Flexicraft-Wrapture, Inc.

Two at Once—Wyle Laboratories, El Segundo, Calif., has acquired Ransom Research, Inc., and Ransom Systems, two California electronics companies. They specialize in solid state digital systems and components for aerospace ground support equipment and industrial applications.

Southern Purchase — Air Products & Chemicals, Inc., Allentown, Pa., has acquired Delta Oxygen Co., Inc., Memphis, Tenn. Delta has facilities at Memphis, Little Rock, Ark., Paducah, Ky., and Greenwood and Clarksdale, Miss.

Aircraft Arm—Dominion Brake Shoe Co., Ltd., Montreal, has acquired an interest in Jarry Hydraulics Ltd., Canada's leading producer of aircraft landing gear and steering systems. Jarry operates three plants in Montreal.

Electronics Entry—Allied Radio Corp., Chicago, has formed a new subsidiary, Allied Electronics Corp. It will direct stepped-up activity in the industrial electronics field.

Modern Move—Louis DeMarkus Corp. and DeMarkus International Corp. have purchased a large new plant at Buffalo. Industrial gas manufacturing operations are now being transferred to the new 100,000 sq ft quarters.

Warehouse Addition — I. Richman & Co., Inc., metal processors, has formed a steel warehousing division at Washington, Pa. The Steel Products Div. will stock hot- and cold-rolled carbon, stainless and alloy steels, and other general steel warehouse products.

Closed Quarters — Vanadium Corp. of America has closed the plant engineering office at Niagara Falls, N. Y. All records and operations have been moved to the Cambridge, O., plant.

Name Change — A. O. Smith Corp. has changed the name of the Smith-Erie Div. to Meter & Service Station Equipment Div. A new plating dept. doubles production facilities at the Erie, Pa., division.

Growth Program—Sangamo Electric Co. is expanding its Pickens, S. C., plant and will build a new facility at Walhalla, S. C. The Marion, Ill., plant is being closed. Production of single-phase electric meters will be shifted from Springfield, Ill., to Walhalla.

United Research—Bituminous Coal Research, Inc., Washington, is consolidating its Columbus, O., and Pittsburgh research activities at the coal industry's new research center at Monroeville, Pa. Development of improved coal utilization methods and equipment will be stressed at the new $1 million center.

Bigger Facility—Reynolds Aluminum Supply Co. has opened a $350,000 warehouse and office at San Diego. It includes fabricating equipment to serve the aircraft and construction industries.

Extra Land—Mideast Aluminum Co. has acquired 10 acres of land near its Dayton, N. J., extrusion plant for expansion purposes. Sutton Engineering Co., Pittsburgh, is designing a new 1000-ton fully automatic, high-speed extrusion press for Mideast.

Relocated Mill—Precision Strip Mill Div., Solar Steel Corp., is finishing installation of a $1 million specialty strip mill operation at River Rouge, Mich. Production capacity will be 30,000 tons per year. Production of magnetically gaged, close tolerance steel strip will begin about Oct. 1.

Spreading Out — R. D. Werner Co. is adding 53,000 sq ft to its fully integrated aluminum plant at Greenville, Pa.

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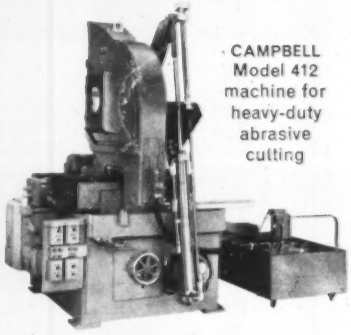
Machines for heavy-duty jobs • ALLISON-CAMPBELL offers a wide selection of precision abrasive cutting machines. For the *big* jobs, the recommendation usually is either the CAMPBELL Model 481, with capacity up to 8″ squares, or the CAMPBELL Model 412, which can cut 12″ squares. Both of these machines have a unique coolant system for greater accuracy, better-quality cuts. Oscillation (the backward and forward motion of the wheel as it cuts through the work), speeds up production, increases wheel life.

For other cut-off jobs, there are four types of CAMPBELL machines in both wet and dry cutting models, with capacities and speeds to suit your own production needs. ALLISON-CAMPBELL also can supply the right wheels for any cut-off job.

Write for details. *For on-the-spot help, call in your* ALLISON-CAMPBELL *field engineer. He's an abrasive cutting specialist, ready to give expert advice.*



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How to Manage Defense Selling

Your company's success in selling the defense market depends on more than keeping up with weapons trends.

Managers must key company plans to the new atmosphere, organize for efficient contracting.

■ As defense spending increases, industry will fill more military orders.

Last week's IRON AGE pinpointed where and how this money will be spent. (IA, Sept. 7, p. 67.) As a manager, you must keep track of these trends and how they affect your company.

But, even more important, you must adjust management thinking to the new business atmosphere. This is especially vital if you are a prime supplier or a subcontractor.

More Complex — Industry-government buying relationships have rarely been smooth. And many forces are working to make them even more complex. Some of these include: Advances in weapons technology. More complex specifications. Greater use of research and development contracts. Cost relationships.

Military specifications offer a good example of what industry faces. Right now the aerospace industry and the Dept. of Defense are working together to simplify and reduce the "vast and expensive paperwork involved in military specifications and required contractor reports."

Simplify, Simplify — The joint study aims at eliminating obsolete documents, consolidating single service specifications covering the same equipment, and getting rid of requirements which unduly limit design.

According to the Aerospace Industries Assn., a large percentage of detailed design specifications sharply restrict new developments. What's more, if a manufacturer makes a change from specs, he must not only prove the innovation will work but also justify why he is not using the obsolete plans.

There are other ways managers can improve defense contracting efforts. Better communications, internally and externally, will help. Sharper marketing is also important. Sound personnel selection and use will aid in developing and selling new products.

Even if all this is done, defense marketing will remain difficult. It has to when technical breakthroughs and political upheavals can change plans and programs overnight. But companies flexible enough to meet changing demands will have an advantage.

Why U.S. Goods Cost More

■ How do manufacturing costs in the U. S. compare with those in other countries?

A new study by the National Industrial Conference Board points out some interesting comparisons. The study was based on analysis of almost 250 sets of cost data for products made in the U. S. and other countries this year and last. It was supplemented by an NICB survey of the foreign operations of over 140 companies.

Labor Costs Higher—As might be expected, U. S. labor costs are usually above those of foreign competitors. But American companies have some cost advantages when compared with manufacturers in other countries.

The survey indicates:

Manufacturing costs are more frequently lower in other major industrialized areas of the world than in the U. S. But higher costs are more often found in less industrialized areas.

Geography has a greater influence on costs than either the product or the industry.

Materials Less Expensive—Materials cost more abroad than in the U. S. in two out of every three cases surveyed. The margin of difference is often sizable.

The wage advantage of foreign operations seldom comes through productivity. Productivity is "almost invariably lower than in the U. S."

Since the last NICB study in this field (in 1956), there seems to be a narrowing of the difference between U. S. and foreign manufacturing costs. Products made at a higher cost abroad are becoming less expensive, but those cheaper to produce abroad have lost some of their advantage.

M&T spray-on vinyl finish goes where the wear is

Two major advantages work for any user of M&T spray-on vinyl finishes. They explain the increasing application of these finishes to automotive interiors such as this station wagon deck as well as appliances, business machines, metal cabinets and instruments.

First is a service benefit. M&T spray-on vinyls are so resistant to abrasion, they outwear ordinary textured enamels by as much as 10 to 1. They also resist stains, scuffing, gouges and cuts. Products that take hard wear look better longer with such a finish.

Second big advantage is in production. These finishes provide a distinctive texture via the *spray gun*. On smooth metal, they can be chemically textured to afford a rich, leatherlike appearance. Sprayed on patterned metal, they "mirror" the pattern with high fidelity even when applied in thicknesses up to 15 mils.

Since the coating is applied to the finished part, it simplifies welding or forming, covers any complex shape, and leaves no raw edges to rust. Rejects are easily stripped and scrap metal is uncoated, for higher scrap value.

M&T has newly enlarged plants to deliver the known quality of vinyl coatings in quantity, in colors specified, on schedule. Plastisol coatings are also produced for heavy duty, industrial protective coating applications. Send for details on M&T Spray-On Vinyls, or for an M&T coating specialist to study your requirements and advise you.

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METAL & THERMIT CORPORATION, General Offices: Rahway, New Jersey
In Canada: M & T Products of Canada Ltd., Rexdale, Ontario

Chrysler Resists Latest Trend

Chrysler Corp. is betting that buyers will still go for the standards and the compacts during the coming year.

Ford, Chevrolet and Mercury planners have different ideas.
By A. E. Fleming

▪ Chrysler Corp. is avoiding the senior compact market which Chevrolet (Chevy II), Ford (Fairlane), and Mercury (Meteor) will try to capitalize on in the coming year.

This may be a risk on Chrysler's part, but it is a calculated one. Strategists believe the company will compete successfully by scaling down the Plymouth and Dart in size and adding a luxury series to the compact Valiant and Lancer lines.

This, of course, means Chrysler is betting high volume sales will remain in compact and standard lines.

A Disadvantage — If the senior compacts click, Chrysler might be in a jam. Without presently knowing what 1962 model prices will be, Plymouth and Dodge are already at a disadvantage on a cost basis.

However, there is another side of the story. There are those who view the Chevy II, Fairlane, and Meteor (and Rambler's slicing of nine in. from the Ambassador) as part of the industry trend to scale-down domestic cars. Chrysler's move is simply more subtle.

The Chrysler approach, says the company, is to offer a wide range of models while preserving the identity of individual car lines. "We think people like to feel a Chrysler is a Chrysler, a Dodge is a Dodge, and a Plymouth is a Plymouth," says president L. A. Townsend.

"We're fairly certain people feel confused and unhappy when a car they've liked and owned and valued for years suddenly gets itself a baby brother."

The Image—Minus any smaller models, Chrysler's 1962 image shapes up like this:

Chrysler Windsor series, which ranked between the Newport and New Yorker in 1961, has been dropped. Newport remains the lowest priced series. It's followed by a newly-designated 300 line, the New Yorker series, a special 300H model, and the Imperial. Fins on these lines are now modified.

Plymouth and Dodge are shorter. Wheelbases have been reduced from 118 in. to 116 in. Each line has three series. But Dodge has added a bucket seat Polara 500 which comes as a hardtop or convertible.

Both Plymouth and Dodge are more lavish looking. Plymouth's hood is longer, wider and more tapering with an elevated wind split running through the center. The rear deck is shorter. Inner headlights are set into a new aluminum concave grille. Outer lamps are housed in big aluminum frames.

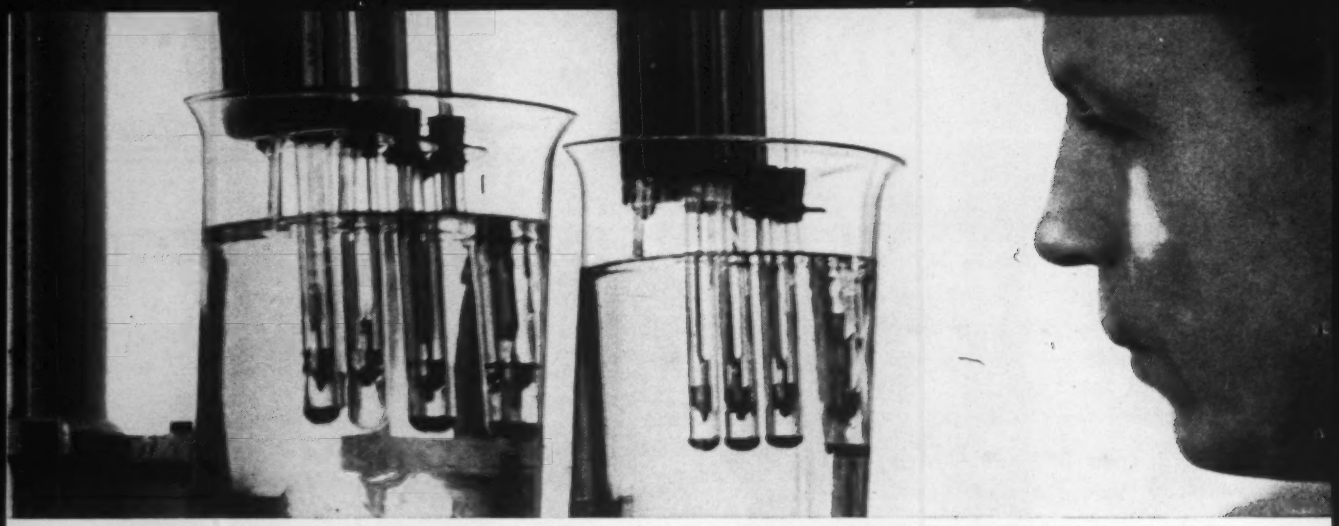
Short Deck—The Dodge Dart has a long hood, more steeply inclined windshield, short rear deck and simpler rear quarters. A new dart-shaped grille slants vertically.

Third series have been added to Valiant and Lancer. They are luxury-type bucket seaters.

Long and Short of 1962 Pontiac Line

TEMPEST LeMANS: Compact convertible has been added to the 1962 Pontiac Tempest line. Engine is in the front, transmission in the rear.

CATALINA VISTA: This four-door hardtop shows the new front-end variation of Pontiac's split-grille style for the 1962 full-size line.



Dropping point test shows how greases react to heat. Beaker fluid has been heated to 390°F. All greases tested except Darina (second tube from left) have passed from solid to liquid state.

BULLETIN:

Shell reveals the remarkable new component in Darina Grease that helps it save up to 35% on grease and labor costs

Darina® Grease is made with Microgel*, the new thickening agent developed by Shell Research.

Darina lubricates effectively at temperatures 100° hotter than most conventional soap base greases can withstand.

Read how this new multi-purpose industrial grease can help solve your lubricating problems and even save you up to 35% on grease and labor costs.

THERE IS no soap in Darina Grease. No soap to melt away—wash away—or dissolve away.

Instead of soap, Darina uses Microgel—a grease component developed by Shell Research.

What Microgel does

Because of Microgel, Darina has no melting point. It won't run out of gears or bearings.

Compared with most conventional soap-base greases, Darina provides significantly greater protection under adverse service conditions.

Mix water into Darina and the grease does not soften. It shrugs off water—won't emulsify.

Resists heat

Darina will withstand operating temperatures 100° hotter than most conventional multi-purpose greases. It cuts leakage and reduces the need for special high-temperature greases.

Also, Darina resists slumping, thus forming a more effective seal against foreign matter.

Saves money

Shell Darina can reduce maintenance expenses while it protects your machinery. Savings of up to 35% on grease and labor are quite possible.

In some cases lubrication intervals have been extended to double what they were before. Less grease is consumed and less time consumed applying it.

For details, see your Shell Representative. Or write: Shell Oil Company, 50 West 50th Street, New York 20, New York.

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Farwest Steel Outlook Brightens

Higher Capital Spending, Defense Needs to Lead Gains

Steelmakers are looking for Farwest metalworking to provide a strong market through the first half of next year.

Defense buildup, higher capital spending, and steel labor talks figure in the outlook.
By R. R. Kay

■ Better economic news continues.

Top executives in the Farwest steel industry say that the fourth quarter will be a strong one. And that 1962 will be a good—very good year for steelmakers there.

All along the Coast, steel executives are singing a happy tune. There's a strong feeling that there will be a zip to sales the first six months of next year.

Fruits of Defense—Kaiser Steel Corp. looks for the 1962 market to be much stronger than this year's. Reasons: More capital spending and beefed-up defense needs.

Another major producer puts it this way: "We think we'll end up this year with a pretty good showing. Business has firmed up for us."

Still another steelmaker says, "Next year looks very rosy and should be a record year for the Farwest."

Good Reading—Most companies agree that the overall volume for this year will make good reading.

Every year, Kaiser Steel releases its Western Steel Market report. It covers the seven Farwest states: California, Oregon, Washington, Utah, Arizona, Nevada, and Idaho. You may get the full report from Vice President C. L. Emerson, Kaiser Center, Oakland 12, Calif.

What to Look For—Actual use of steel this year should be pretty close to last year's 6.27 million tons.

A 5 pct rebound in home building will hop up the market. In the non-residential construction field, Kaiser predicts: Missile bases up 50 pct and public buildings up 25 pct.

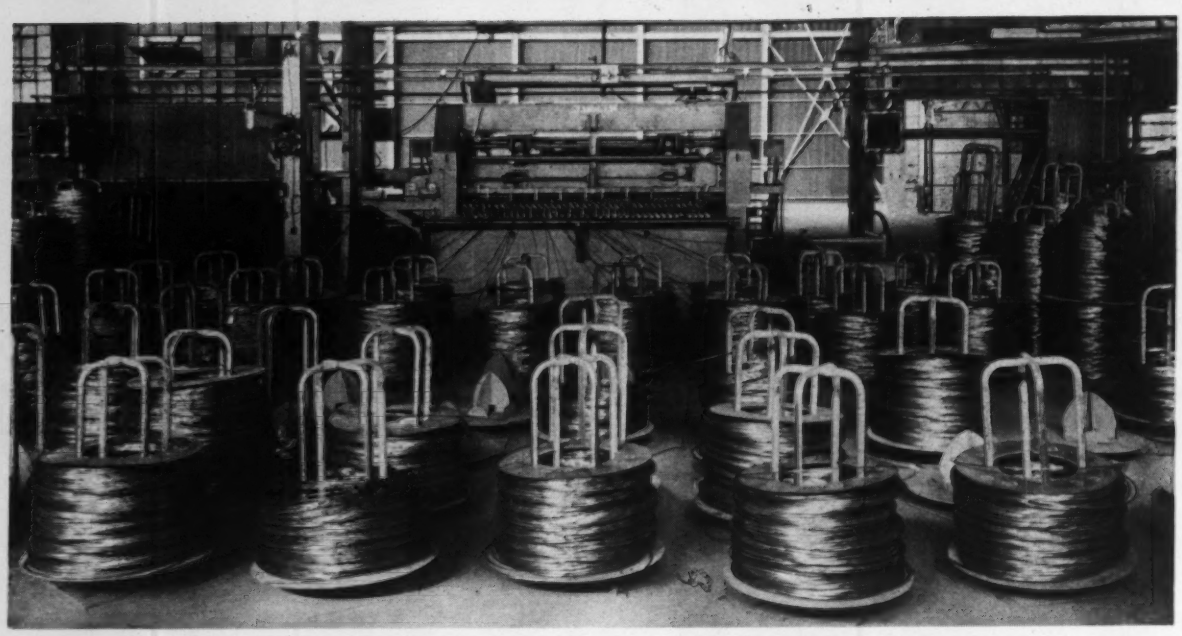
Less Dam Business—Look for dam construction to ease 10 pct. Private office building starts will be off 20 pct. Schools and highways will show narrow changes.

Tip to marketing men: Southern California is your biggest Farwest steel market. Last year, the area ate up 2.6 million tons—41 pct of the steel mill products in the seven states. Next in line is northern California with over 2 million tons —33 pct. Consumers in Washington and Oregon took 900,000 tons —14 pct. Arizona, Utah, Nevada, and Idaho, together used 800,000.

Pattern of Farwest Steel Use: 1957-1960

PRODUCTS	1960 Net Tons	1959 Net Tons	1958 Net Tons	1957 Net Tons
Plates	1,095,000	936,000	925,000	1,333,000
Sheet and Strip	1,360,000	1,257,000	1,065,000	1,144,000
Struct. Shapes	495,000	460,000	400,000	702,000
Hot-Rolled Bars and Bar Shapes	1,015,000	1,110,000	930,000	1,085,000
Pipe and Linepipe	440,000	470,000	360,000	503,000
Tin Mill Products	1,040,000	1,120,000	1,150,000	1,100,000
Other Products	965,000	1,025,000	810,000	1,053,000
Total	6,410,000	6,378,000	5,640,000	6,920,000

Source: Kaiser Steel Corp.



Stop avoidable coil-changes with DSC LPR® COILS and you stop fabrication downtime, needless scrap, and other production losses

We Make and Take Our Own LPR Medicine

At DSC we manufacture just one end-product, namely, welded wire fabric for concrete reinforcement. Naturally, the material used is Portsmouth produced Brite Wire in LPR coils.

Pictured above is one section of our Portsmouth Division Fabric Department. It takes up to eighty 3,000 pound LPR's, all running together, to feed that mammoth weaver and welder in the background. . . . And to think that in the beginning we used 300 pound traditional mill bundles!

The LPR Idea Is Born

In the early 1950's, it dawned on us that short run bundles were the cause of our own intolerable fabricating costs. To insure our economic survival, we conceived and developed LONG PRODUCTION RUN LPR's. Once perfected, we made them available to the Brite Wire fabricating industry. Now you can obtain LPR's in weights up to about 4200 pounds, depending on your wire sizes.

Customer Satisfaction—Our No. 1 Job

PROOF OF PERFORMANCE

What we say about the cost-saving advantages of LPR's reflects not only our own experiences, but also the experiences reported by our LPR customers. For example:

- **Downtime frequency due to coil changes and set-up adjustments reduced as much as 95%**
- **Unloading time alone cut as much as 82%**
- **Productivity increased from 20% to 33⅓%**
- **Scrap loss slashed in direct ratio to coil changes avoided**
- **Man-hour costs trimmed 20% and more**
- **High-density, self-supporting coils reduced storage space by 20% to 50%**
- **Inventory management greatly improved**
- **Returnable-carrier problem and small coil racks eliminated**

These extra benefits are yours without extra cost.

Learn what LPR's can do for your Brite Wire operations. Call your nearest DSC customer "Rep" for the facts, or write Detroit Steel Corporation, Box 7508, Detroit 9, Mich.

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Customer "REP" Offices in Principal Cities

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Hammer to Strike Mighty Blow

It Will Precision Forge Hard Metals for Defense

A new mechanical forging press is capable of delivering an 8000-ton blow every two seconds.

The giant hammer may well nudge futuristic aircraft designs off the drawing board and into full-scale production.
By R. H. Eshelman

■ Slamming into operation later this month—if all goes well—will be a unique forging press. It's expected to give a boost to America's manufacturing technology. It's mammoth joint venture of the Air Force, National Machinery Co., and the user, Thompson Ramo Wooldridge.

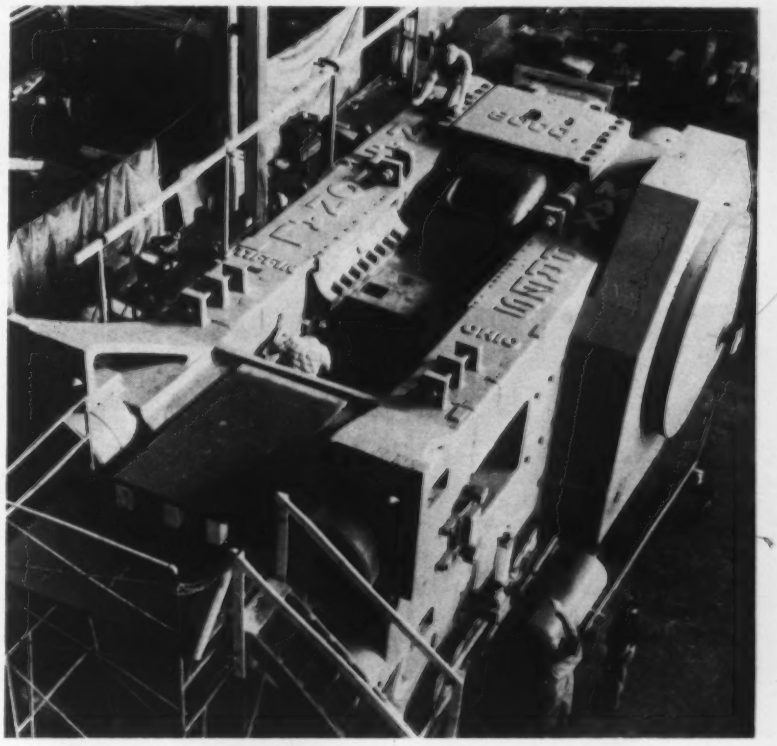
Improved product reliability, increased capability and substantial reduction in production costs will mean a fast payoff on the $1,455,000 installation.

Cut Finishing Costs—Big immediate gain will be in elimination of virtually all finish machining. In finishing costs alone, savings of $790,000 a year are anticipated.

The mechanical press is designed to deliver 8000-ton blows every two seconds. Precision parts, such as jet-blade airfoil sections, can be knocked out within tolerances of 0.004 in. This is on advanced materials such as hard die steels (Udimet, Waspalloy, Inconel).

Looking further to the future, engineers say this press will usher in a new era in large precision forgings of titanium, tungsten and columbium alloys.

Off the Board—It means that many futuristic designs can now move off the drawing board into production.



TIFFIN GIANT: What is believed to be the world's largest high-speed mechanical press for precision forging, ordered by the Air Force, lies on its back for final assembly at National Machinery Co., Tiffin, O.

Further, it indicates that military and commercial manned aircraft and spacecraft are indeed in the production picture in the foreseeable future.

This job is just one of the fruits of past Air Force technological programs. More will be coming, and at an even faster rate. In fiscal 1962 the Dept. of Defense is planning to place some $6 billion with industry for research, development, testing and evaluation.

Problem Solving—In building this precision giant, National Machinery engineers faced some unusual problems.

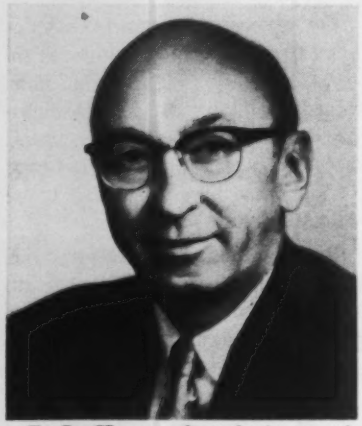
For example, to simplify they decided to assemble the mammoth on its back rather than upright. Four forged-steel tie rods, 2 ft in diameter, hold it together. These extend the full length of the press—over 31 ft. These huge bolts had to be threaded for two-ton nuts.

In production, Thompson and Air Force experts expect the press to knock out present design forgings with fewer blows. It will cut process inventory and eliminate overloading of present equipment. Also, it affords a new high in capacity for handling larger piece-parts previously impossible to forge.

MEN IN METALWORKING

John Powers, appointed vice president, operations, Verson Allsteel Press Co.

E. G. Hartmann, elected vice president in charge of sales, Wickwire Spencer Steel and John A. Roebling's Sons Divisions, Colorado Fuel & Iron Corp.



R. L. Hanes, elected vice president in charge of sales, Western Div., Colorado Fuel & Iron Corp.

Hyster Co.—H. N. Black, named senior vice president.

Verson Allsteel Press Co.—Henry De Matteo, named manufacturing and works manager.

Bell & Howell Canada, Ltd.—R. H. Garretson appointed to the board of directors.

Speakman Co.—George Chester, elected vice president, secretary and treasurer; J. R. Masterson, Jr., elected vice president, manufacturing; J. J. Traynor, elected vice president, sales.

Meissner Engineers, Inc.—E. A. Bartkus, appointed vice president, research and development.

Borg - Warner Corp. — Harold Nutt, elected chairman and chief executive officer, Borg & Beck Div.

Revere Copper and Brass Inc.—R. P. Winberg, appointed vice president, foreign operations.

Litton Systems, Inc.—J. J. Connolly, named vice president of Litton, and general manager, Data Systems Div.

Paterson Boiler & Tank, Inc.—John Galandak, appointed executive vice president.

Allis - Chalmers Manufacturing Co.—T. D. Lyons, elected vice president, administration, Industries Group.

Alan Wood Steel Co. — C. B. Smith, appointed general manager and Frank Spaniel, appointed general superintendent, Penco Div.

Jones & Laughlin Steel Corp.—J. F. White, appointed asst. purchasing agent, raw materials.

National Steel Corp. — E. E. Vondergoltz, appointed manager, product development, Stran-Steel Div.

American Hollow Boring Co.—W. J. Sipple, appointed works manager.

E. G. Swigert, appointed chairman of the board of directors and chief executive officer, Hyster Co.

P. S. Hill, named president, Hyster Co.

Electro Refractories & Abrasives Corp.—S. W. Bradstreet, appointed technical director.

Consolidated Electrodynamics Corp.—J. J. Smith and E. E. Hotchkin, appointed asst. directors, engineering; L. B. Browder, named manager, advanced development. All of Data Recorders Div.

Anaconda American Brass Co.—A. J. Krull, named sales manager and E. L. Wilmot, appointed asst. sales manager, Fabricated Metal Goods Div.; W. F. Meister, named district sales manager, Newark office; R. C. Donovan, appointed asst. works manager, Anaconda Metal Hose Div.

United States Steel Corp.—P. L. Daley, appointed asst. chief metallurgist, National Tube Div.

(Continued on P. 162)

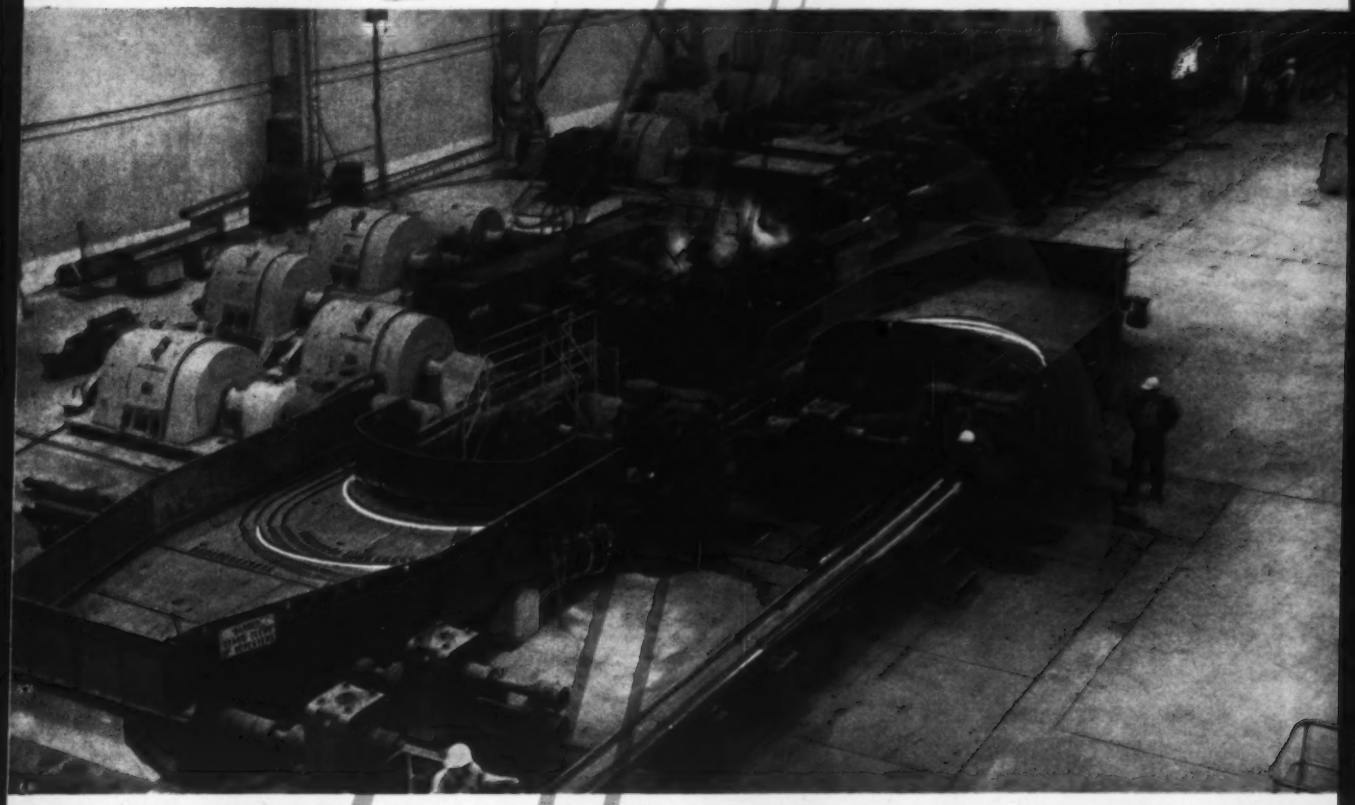
MORGAN MILL INCREASES BETHLEHEM'S FAST RE-BAR CAPACITY

HIGH SPEEDS BOOST BAR PRODUCTION

ADAPTABLE FOR SIZE CHANGE AND SPECIAL CUT-OFF

ELECTRONIC CONTROLS MAINTAIN UNIFORM QUALITY

Deformed, concrete reinforcing bar is being turned out at the rate of 2600 f.p.m. in Bethlehem Steel Company's new Bar Mill at Steelton, Pa. This new, fully automatic, double strand Morgan mill can produce a five-ton bundle of No. 3 bars every 10½ minutes—operating data which underscore Morgan's world-recognized engineering ability to design mills that meet the current market demand.



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ROLLING MILLS • MORGOIL BEARINGS • WIRE DRAWING MACHINES • COMBUSTION CONTROLS

(Continued from P. 160)

Kaiser Aluminum & Chemical Corp.—G. C. Davis, Jr., appointed director, technical planning, and R. E. Pardee, appointed manager, technical services, Kaiser Refractories Div.

American Steel Foundries—R. C. Howell, appointed chief works engineer, Transportation Equipment Div.; J. H. Lund, named manager, railway sales, Hammond Div.

Allied Chemical Corp.—A. H. Baker, appointed regional sales office manager, New York Metropolitan and A. B. Connelly, Houston, H. E. Donaldson, St. Louis, W. P. Doyle, Buffalo, E. R. Lett, Birmingham, W. G. Webster, Denver, all of General Chemical Div.

Air Reduction Sales Co.—J. J. Rendos, appointed asst. manager, Cryogenic Engineering Dept., Plainfield, N. J.

Baird Machine Co.—C. P. Foreman, appointed chief engineer.

J. P. Cartwright, elected vice president, machinery group, Dresser Industries, Inc.

Columbus Bolt & Forging Co.—T. M. Cowman, appointed director, sales; D. J. Clark, appointed manager, Detroit sales; J. L. Hindes, appointed director, manufacturing (effective Jan. 1, 1962).

Hanchett Magna-Lock Corp.—B. G. Thorstenson, appointed sales manager.

American Bosch Arma Corp.—P. V. Cerar, appointed East Coast director, military marketing.

Dana Corp.—W. H. Schomburg, Jr., named general sales manager; J. P. Henson, named asst. general sales manager.

General Dynamics Corp.—J. M. Hinchey, appointed general sales manager, Electro Dynamic Div.

Pacific Tube Co.—A. C. Geldner, appointed asst. general sales manager.

Gar Wood Industries, Inc.—W. E. Van Horn, appointed sales manager, Hydraulic Div.

Sperry Rand Corp.—Jacques Carpenter, appointed central regional sales manager, industrial dept., Vickers, Inc., Div.

Wapakoneta Machine Co.—R. B. Murphy, appointed district manager, Chicago sales div.

Cohn Electronics, Inc.—H. G. Hoefler, appointed New England sales manager, Massa Div.

Buying LAMINATED PLASTICS . . . as sheet,

Use this Taylor Selection Guide to make selections of the Taylor laminated plastics that will fit your requirements.

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Taylor has the products: . . offers more than 50 grades of industrial laminated plastics . . . including paper, cotton cloth, nylon, asbestos, glass cloth, or other base material impregnated with phenolic, melamine, silicone or epoxy resins and formed into sheets, rods and tubes under heat and pressure. Also a number of composite materials, including copper-clad laminated plastics, vulcanized fibre and laminated plastics, rubber and laminated plastics, asbestos and laminated plastics, and aluminum and laminated plastics.

J. J. Huber, appointed general manager, Magnet Div., Crucible Steel Co. of America.

Foxcraft Products Corp. — Sam Greenbaum, appointed director, sales promotion.

Bucyrus-Erie Co. — D. W. Waack, appointed manager, sales promotion.

Vanadium-Pacific Steel Co.—M. J. Granger, named metallurgist and engineering consultant.

Howard Industries, Inc.—D. F. Hansen, appointed sales manager.

Kennecott Copper Corp.—Howard Lanier, named manager, selenium and columbite sales, Kennecott Sales Corp.

Detroit Steel Corp.—J. R. Ricker, named manager, and R. L. Martz, named asst. manager, Chicago district sales; J. J. Witzig, Jr., named manager, and L. H. Dickson, named asst. manager, Indianapolis district sales.

Hull Corp.—H. B. Beisswenger, appointed district manager, sales, metropolitan New York, Long Island, and northern New Jersey.

Kilby Steel Co.—J. E. O'Brien, appointed inside sales and office manager, Houston; J. R. Lamp, appointed tubular sales representative, Dallas and West Texas; R. D. Bartow, appointed tubular sales representative, Tulsa.

Wilbur & Williams Co., Inc.—C. C. Naylor, appointed manager, central sales district.

W. A. Russell, appointed vice president, marketing, Miniature Precision Bearings, Inc.

Osborn Manufacturing Co. — G. M. Shibley, named sales manager, Brush Div.

Carpenter Steel Co.—T. E. Murphy, appointed manager, tool steel sales.

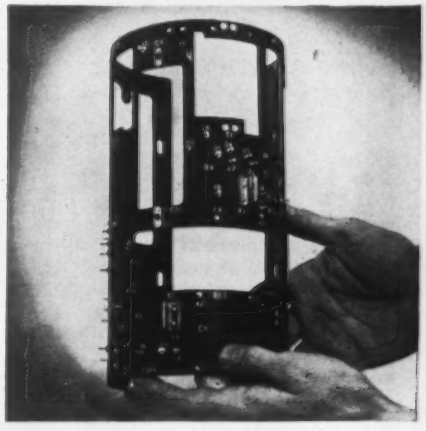
Permattach Diamond Tool Corp.—H. W. Fichtner, appointed national sales manager.

---

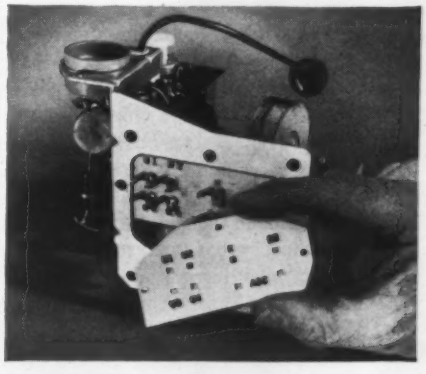
rod, tube or fabricated parts?

Taylor has the facilities. Its Norristown, Pa., plant, comprising some 300,000 sq. ft., produces both laminated plastics and vulcanized fibre . . . is one of the most completely integrated in the industry . . . even makes its own paper and a large percentage of its own resins. The La Verne, Calif., plant, with over 45,000 sq. ft. of floor space, specializes in the manufacture of laminated plastics for the convenience of West Coast customers. And both plants can fabricate parts from any Taylor materials to specifications, economically.

Taylor laminates offer many advantages over metals. They have a higher strength-to-weight ratio, are corrosion resistant, and can be fabricated more easily. This Taylor Selection Guide will help you evaluate the different grades available. Write for your copy today. Taylor Fibre Co., Norristown 52, Pa.



For applications requiring high strength retention at elevated temperatures, Taylor Grade GEC—an epoxy resin, glass fabric base material.



For high-temperature electrical applications and high-frequency radio equipment, Taylor Grade GSC—a silicone resin, glass fabric base material. Has high heat resistance, excellent electrical properties, and high arc resistance. Will not support combustion.

Taylor

LAMINATED PLASTICS VULCANIZED FIBRE

Straits Tin Report

Tin-lined copper tube recently developed combines tin's corrosion resistance and malleability with the strength and ductility of copper. Pure molten tin is gas-propelled through the tubing to form a continuous, fusion-bonded tin lining that will not chip, crack or peel, and can be

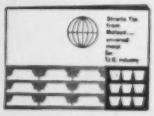
Photo courtesy Phelps Dodge

bent, flared, flattened or soldered. Tin provides immunity to corrosive sulfur conditions found in some natural gas and petroleum products; affords excellent resistance to flaking action that can plug lines and orifices and create hazards with gas appliances. The tin lining also prevents contamination of fluids in process lines of food, beverages, pharmaceutical and water distilling equipment and for sampling lines to laboratory or control instruments, according to its producers, Phelps Dodge Copper Products Corp.

Acid pickling of steel before hot tinning produces maximum bond strength of bearing metal to steel. Shot blasting preparation lowers bond strength, possibly because of distortion, folding and flowing during precleaning.

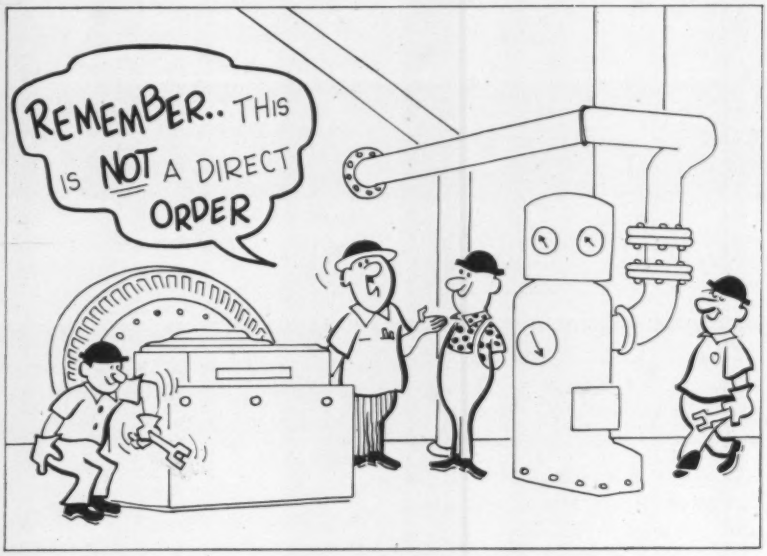
FREE Brochure

16 interesting pages of information about the latest uses of tin in U.S. industry. Write today for your copy.



The Malayan Tin Bureau
Dept. S-54-J, 2000 K St., N.W., Washington 6, D.C.

You Arbitrate It!



Wrong Agent

▪ Under the union contract in a hardware manufacturing plant, employees assigned to non-continuous operations were not supposed to be asked to work on paid holidays except in an emergency.

Call for Volunteers — Nevertheless, management decided to ask several men to do some machine repair work that was piling up. It was made clear to the employees that this wasn't a direct order. They could decline the offer of work without losing regular holiday day or incurring any disciplinary penalties. A few of the employees agreed to come in on the holiday.

Next week, the union filed a grievance. "A backlog of work is no emergency within the meaning of the contract," said the chief shop steward. "You had no business ordering the repairmen to work."

"Okay, so it wasn't an emergency," replied the superintendent. "But we didn't order them to work. They could have turned down the offer if they wanted to. Are you complaining because some of your members earned extra money?"

The case finally went to arbitration under the Rules of the American Arbitration Assn. How would you rule?

The Arbitrator Ruled:

The fact that the company gave employees a choice about working was irrelevant, said the arbitrator. "It fails to take into account the fact that the prohibition against holiday work on non-continuous operations was collectively bargained for and agreed upon." He added that when the company found it necessary to by-pass the contract temporarily, the problem should have been put before the bargaining agent—in this case the union — not individual workers.

From the files of
The American Arbitration Association

"You Arbitrate It!" appears in the second issue of the The IRON AGE each month. Look for it in the October 12, issue.

CAUTION: The award in this case is not necessarily an indication of how arbitrators might rule in apparently similar disputes. Each case is decided on the basis of the particular history, contract, testimony and other facts involved. Some of these essential details may have been omitted in condensing the original arbitration for brief presentation.

HAYNES STELLITE cobalt-base alloy, deposited mechanically, is used to hard-surface this 12 in. diameter, 24-ft. plastic-extrusion screw.

Hard-Facing?

There's a
HAYNES Alloy
for the Job!

What happens to hard-facing quality when you switch from manual to automatic? Here's a typical case:—

Sound, smooth, non-porous deposits were being achieved manually on the flights of big conveyor screws. As production volume increased, HELIARC automatic hard-facing promised economies.

After the switch, deposits were of the same high quality. Economies soared. The key: A HAYNES STELLITE cobalt-base alloy—equally reliable whether deposited manually or by machine. And note this: The automatic method cut deposition time up to 40 per cent. Saved 10 to 15 per cent in material.

Whatever hard-facing method you select as most economical, remember there's a HAYNES alloy that will work with it . . . and do an outstanding job of protecting the part. HAYNES alloys come as powders, bare rods, electrodes, tubes and coils. Write for full information.

HAYNES
ALLOYS

HAYNES STELLITE COMPANY
Division of Union Carbide Corporation
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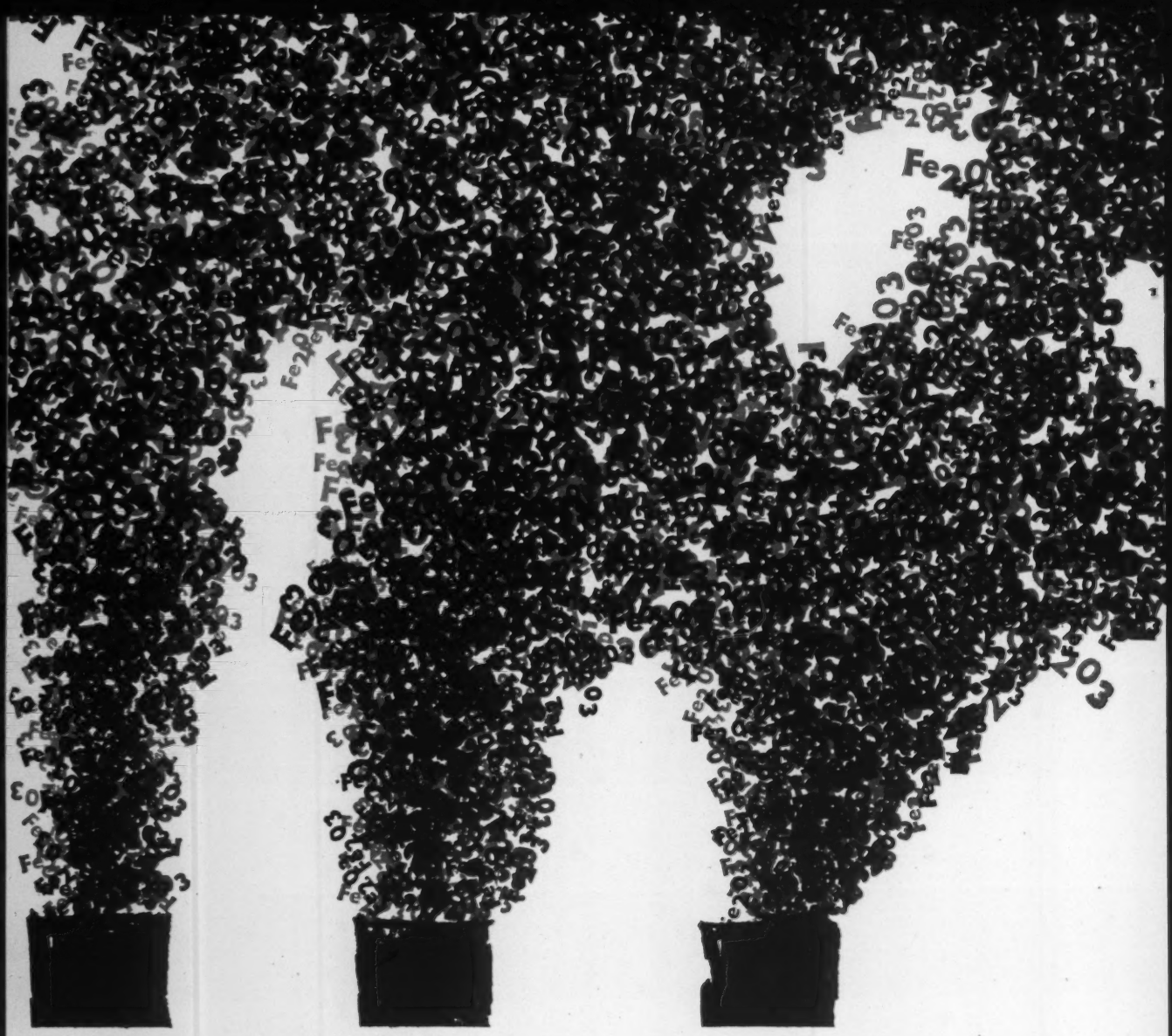


USING O_2 IN YOUR OPEN HEARTH? Chemico Venturi Scrubbers do more than simply solve the air polution problems brought on by the use of oxygen in steel making. Operating and performance figures indicate that for oxygen steel converters, oxygen lanced open hearth furnaces, electric furnaces and flame scarfing, the Chemico Venturi Scrubber solves those problems with higher efficiency and at lower cost than any other method now in operation. Specifically, these are the advantages of a Chemico Venturi Scrubbing System:

CAPITAL INVESTMENT—Chemico Venturi Scrubbers can be installed for approximately 30-50% less capital cost than required for electrostatic precipitators.

OPERATING AND MAINTENANCE COSTS—Chemico Venturi Scrubbers require so little maintenance and manpower, that over-all operating costs are dramatically lower than for other methods, even though power requirements may sometimes be slightly higher.

CONSISTENT PERFORMANCE—The Chemico Venturi Scrubber attains maximum cleaning efficiency at start-up. This peak efficiency is not decreased by subsequent changes in the gas flow or other variations in process conditions.

COLLECTION AND DISPOSAL—The Chemico Venturi Scrubber collects iron oxide dust wet and recovers it dry—free of contaminants and ready for re-use. It eliminates the common and very serious problem of how to handle and dispose of dry dust collected in an electrostatic precipitator.

WATER REQUIREMENTS—The Chemico closed cycle scrubbing process eliminates water disposal problems and cuts make-up water requirements to a minimum. Normally, no more than 50-100 GPM is needed.

PROCESS FLEXIBILITY—Adjustable Venturi throat permits automatic control of furnace draft while maintaining full cleaning efficiency.

If you are considering the installation of gas cleaning equipment, a Chemico representative would be pleased to discuss performance and cost figures with you. Chemico handles the complete job:

PLANNING—DESIGN—ENGINEERING—CONSTRUCTION and START-UP.

CHEMICO

Chemical Construction Corporation, Gas Scrubber Division, 320 Park Ave., New York 22, New York
Ferndale, Mich. Chicago, Ill. Los Angeles, Calif. Houston, Tex. Bartow, Fla. Birmingham, Ala. Pittsburgh, Pa.

The Cape Will Grow

Cape Canaveral, U.S. space center of today, also looks like the space center of tomorrow. After a survey of possible sites, NASA and the Defense Dept. decided the Cape was best suited for future shots to the moon. The Cape will be enlarged about five times to meet moon-shot needs. Later, the grounds will serve as a port to Mars and Venus.

Sensors Withstand Heat

High-temperature strain gages, the small sensors applied to surfaces to determine stress, can be sprayed on like paint from a gun. So say researchers at Boeing's Aero-Space Div. The sprayed-on sensors have withstood temperatures up to 1200°F and in time are expected to be pushed past 2000°F.

Photosynthesis in Space

At a recent science symposium, researchers announced a new technique for using green plant mechanisms to void carbon-monoxide poisoning in space ships. Chlorella, a common algae can do the job. It will also provide oxygen and perhaps even food for space travelers. Further research is expected to bring startling advances in life on this planet as well as in space.

Iron Ore-Filled Concrete

Work is getting under way at Argonne National Laboratory on cells for handling highly radioactive materials. Concrete, used for the shields in the new three-story lab, will be loaded with iron ore. This will enhance the materials shielding values. The cells will have a shield rating of one million curies of gamma radiation.

Anti-Satellite Satellite

With Russian plans for a nuclear satellite believed well under way, look for crash programs to develop an anti-satellite satellite. The big question is, "Can automatic controls do the job?" A manned approach may be needed for intercept, identify and destruct stages. Without a satellite defense system in space, even a dummy nuclear satellite could achieve atomic blackmail.

Checks Missile Stability

Before a missile design gets the green light, its aerodynamic stability must be proven. The

MISSILE MODEL: Gets stability check.

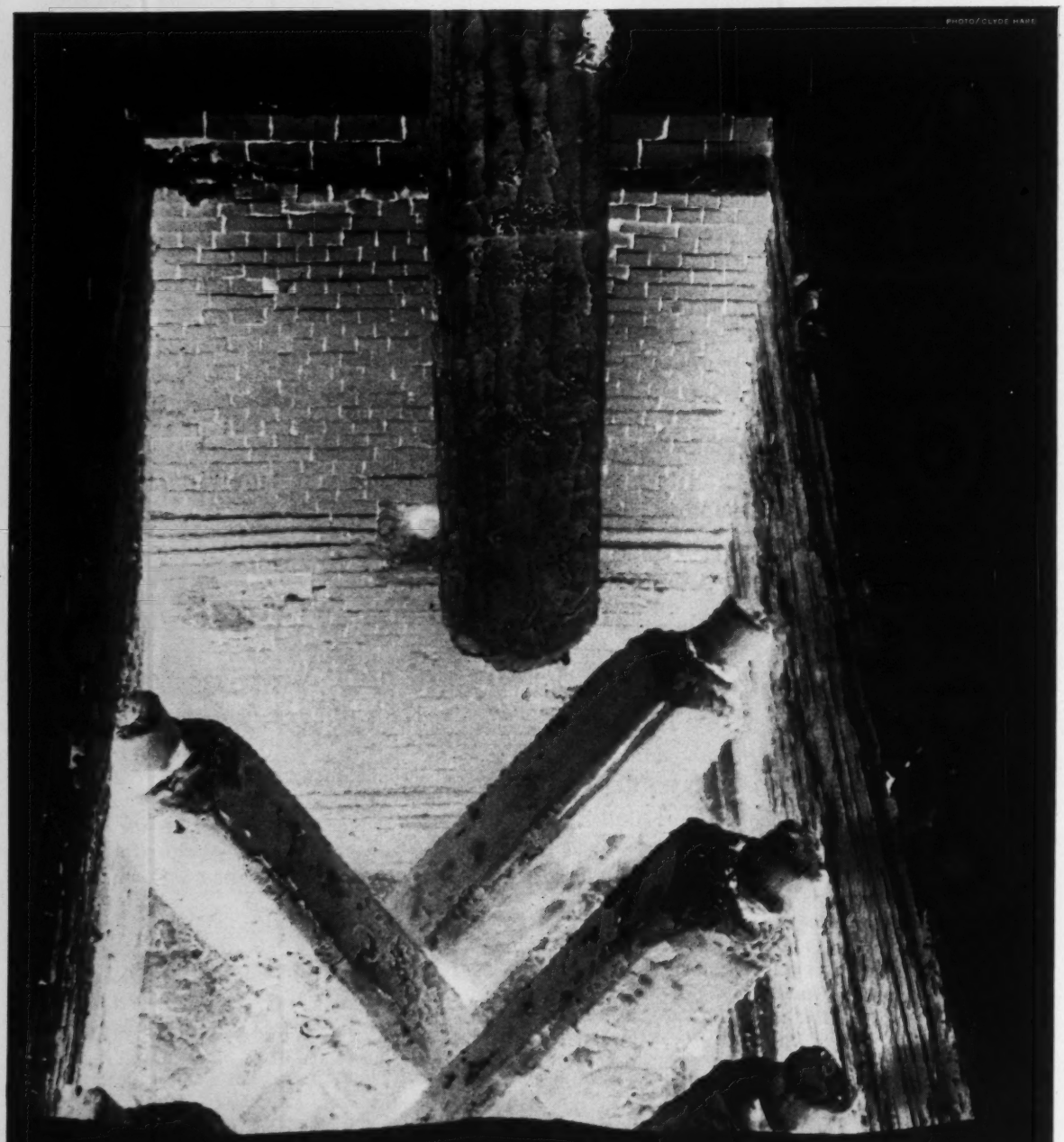
Navy's new phototransistor tachometers do just that. The units measure the spin rate and spin decay of miniature missile models as they fight a supersonic wind-tunnel airstream. The unit clocked some models at speeds as slow as 2 rps.

Gold-Metallized Teflon

Recent tests prove that a thin film of chemically deposited gold reduces the permeability of Teflon to some high-energy fuels as much as 1000 times. Several missile manufactures are now evaluating gold-metallized Teflon. If the engineering and service tests confirm lab results, one of the most difficult problems in the use of bladder systems for fueling engines at zero gravity will have been solved.

NASA Predicts Action

NASA Administrator J. E. Webb predicts that communications satellites will be in action by mid-1962. Webb forecasts television signals will be bounced off a satellite by July of next year. However, this would only be a test run. Three communications satellites are expected to be up next year, two by AT&T and another by RCA.



Forged blooms in this soaking pit at Green River Steel are kept at an accurate 2200 F., with the precise control of gas heat.

Green River Steel relies on GAS for precise control of critical heats. At Owensboro, Kentucky, Green River Steel Corporation, subsidiary of Jessop Steel, produces clean, fine-grain alloy steels. For quality control in heat processing this producer relies on the precise control and uniform heat of gas. □ Gas preheats ingots to maintain critical temperatures for rolling. Gas gives instant, accurate heat in Green River's 4 reheating furnaces and 8 soaking pits. The entire operation is more profitable because of the unbeatable economy of gas. □ You can upgrade heat processing, keep costs down with the precise control, speed, cleanliness, economy and dependability of gas. Call the Industrial Sales Engineer at your local Gas Company.

American Gas Association **FOR HEAT PROCESSING...GAS IS GOOD BUSINESS!**

Third of an iron age series, METALWORKING'S TECHNOLOGICAL EXPLOSION:

Steelmaking

The problems, ideas and innovations sparking the steel industry's greatest decade of change

By C. L. Kobrin, metallurgical editor

Steelmaking is bursting with new ideas—more so than any other time in its history.

Whatever the reason—competition from other materials, higher operating costs, imports, or a new awareness of customer responsibility—the steel industry is undergoing a technological explosion.

Shaping future steelmaking practices are these key issues: Direct reduction versus the blast furnace; sinter or pellets, fuel injection; oxygen steelmaking, vacuum treatment, continuous casting, and the "push-button plant."

Changes now taking place in the art of steelmaking will not be applied across the board. There are too many variables. Among them: Type of ore, geographic location; cost of raw materials, energy, labor; existing plant facilities. Each new practice must be evaluated on a plant-by-plant basis.

What about the future of the blast furnace, for example? Will it be bypassed by a direct-reduction process?

"A number of imaginative schemes for the direct reduction of iron ores has been proposed," explains J. B. Austin, vice president, research and technology, U. S. Steel Corp. "But for large tonnage production, there's nothing to compare with the very efficient blast furnace."

At least a dozen direct-reduction processes—in various stages of proven technical and economic feasibility—are available to U. S. producers. Several are operating in other countries.

"However, within the next ten years, I see no tremendous use for direct reduction in this country," says Dr. Austin. "Instead, most applications for it will be for special situations, or plants making minor additions to capacity.

"If the price of hydrogen comes down, however, then

Console in control room at Vanadium-Alloys Steel Co. permits constant monitoring of consumable vacuum melting.

Vacuum-melted ingots, such as this one lowering into soaking pit at Vanadium-Alloys Steel Co., will be in greater demand.

we'll have to re-examine some of these newer processes," adds Dr. Austin.

Despite the high esteem with which blast furnaces are held, it's unlikely that their number will increase. "In fact," says Owen R. Rice, consultant, Koppers Co., Inc., "by 1970, there will be about 40 fewer blast furnaces than there are today.

"There are two reasons," comments Mr. Rice. "The average blast furnace of 1970 will be larger; the impact of current technology will be greater."

Even the most conservative estimate is that the output from blast furnaces will be about 40 pct higher in 1970 than in 1960.

New technology will play the greater role in this added productivity. "Certainly, the blast-furnace picture would be a different one if, today, the coke rate were still 1900 lbs per ton of pig iron as in 1947. In 1960, the as-charged coke rate to all blast furnaces averaged 1565 lbs. The average rate in 1970 should be about 1325 lbs," says Mr. Rice.

Three dominating influences will bring about the lower coke rate: Ore beneficiation; supplementary fuel injection; and higher blast temperatures.

"Improvement of the iron-ore burden, ore beneficiation, is the greatest advance in blast-furnace art in the last ten to fifteen years," says Mr. Rice.

Capacity of many furnaces has increased anywhere from 10-30 pct. An Armco Steel Corp. furnace at Middletown, O., for example, is reportedly turning out almost 3000 tons per day. Taking much of the credit for this remarkable achievement is ore beneficiation—in this case, a burden of specially-sized pellets.

Sintering pioneered the trend toward beneficiation. Use of taconite pellets, initiated in 1956, strengthened the trend. Both techniques are breathing new life into the U. S.'s low-grade ore deposits.

Whether sinter or pellets is the more attractive method for agglomeration still remains to be proved. The choice will vary from plant to plant. However, the trend toward the ultimate goal of 100 pct tailor-made feed is well on the way.

"Fuel injection—another important influence in the new blast-furnace technology—also points up the emphasis on new materials, and the speed with which steelmen are adopting new ideas." So comments D. L. Campbell, special assistant to the vice president, petroleum products, Esso Research and Engineering Corp.

"For a combined use as a low-cost reducing agent and energy source in blast furnaces, the oil industry is delivering natural gas or fuel oil.

"And over the next ten years, more and more steel plants will surely take advantage of gas or oil for both blast furnaces or direct reduction."

The trend is shaping up very rapidly. Within the past year, at least six major steel companies have completed initial studies on fuel injection. All report decreased coke rates, smoother running furnaces and higher production rates—in some cases, up to 20 pct.

Peephole inspection at tuyere permits Esso Research and Engineering Co. scientists to study effects of oil injection in blast furnaces.

Whichever the fuel—oil, natural gas, coke-oven gas, or even powdered coal—it's just a question of time, experts say, until most blast furnaces switch to fuel injection.

Choice of fuel will be largely affected by the plant's geographic location. Western steel producers, for example, located far from metallurgical coke and close to the

Power amplifier, used in simulation of mill drive systems, enables GE's Industry Controls Dept. to test control equipment under operating conditions.

oil fields, find fuel injection a welcome advance in iron making.

The next important news in blast furnacing is now in the making. It's one step beyond gas or oil injection—the use of an oxygen supplement.

Initial reports from Colorado Fuel and Iron Corp., where tests are under way, indicate that oxygen and fuel injection can increase pig-iron production by 50 pct over that obtained with just fuel injection. As a result savings in coke are about 20 pct.

The first complete report from CF&I may trigger a wave of similar fuel-oxygen injection programs in steel plants throughout the country.

These recent developments in blast-furnace technology reveal that, even after 150 years, there is still a lot to learn about the furnace. U. S. Steel's experimental blast furnace at Duquesne, Pa., slated for 1962 completion, is expected to provide some answers.

Oxygen is already firmly entrenched in about 25 pct of the country's openhearths. Others are in the process of adopting it.

The reason: Unlike the blast furnace, the openhearth has a very low thermal efficiency. It's been likened to trying "to boil water in a saucer with a candle flame held above the water."

"It's now possible, though," says J. A. Hudson, manager, steel mill sales, Linde Co., "for one openhearth to do the work of two or more.

"This increase in capacity will enable steel producers to expand output without a corresponding increase in new investment for furnaces."

Directing jets of oxygen onto the molten bath speeds up the melting and refining time. Production doubles to about 45 tph. Some furnaces, under special test conditions, are turning out 100 tph.

The advantages of oxygen have been known since the days of Sir Harry Bessemer. But it wasn't until the last few years that oxygen has been available in tonnage lots —and at increasingly lower costs.

The development of basic brick to give economical roof life and special lances to inject the oxygen are helping to effect this new practice.

Thus, in the last ten years, steel-plant use of oxygen has jumped from about 100 cu ft per ingot ton to about 400 cu ft per ton. Estimates are that this figure will double in another year.

Despite the lower operating costs that result from oxygen roof lancing, the supremacy of openhearth steelmaking is being challenged. The rival? Basic Oxygen Processes (BOP) which include the L-D, Stora Kaldo,

Steel plant uses for oxygen, says the Linde Co., will skyrocket in the next year.

and Rotor processes. As yet, only L-D units are operating in this country. The first Stora-Kaldo unit at Sharon Steel is expected to be in operation by the end of 1962.

Openhearths will continue to be the workhorse of the industry (86 pct of the total U. S. steel production in 1960) for many years. But since its debut in 1954, current and committed BOP capacity has skyrocketed to 10,000,000 tons.

"And as the need for new furnaces arises because of expansion or replacement of furnaces, we will certainly see more and more oxygen-steelmaking vessels," says Dr. Austin.

Some observers predict that, because of their lower capital cost per annual ton and lower operating costs, BOP will account for at least 20 pct of our total steel production in 1970.

Behind this trend lies the extremely high production rates of the oxygen-steelmaking furnaces. By blowing high-purity oxygen into the furnace onto a bath of molten iron, steel is formed at the rate of about 2 tons per minute. This is twice as fast as most modern production openhearths. And two new furnaces, now under construction at Jones & Laughlin Steel Corp., are expected to turn out 200 tph.

Electric furnaces rank second to openhearths in total steel production. How do they fit into steelmaking plans of the future?

"The trend toward more specialty steels and higher quality in all grades of steel increases the importance of electric furnaces," says F. C. Langenberg, manager, process research, Crucible Steel Co. of America.

New techniques are constantly under study to help the electric furnace industry improve its competitive position. One may well be to use oxygen-fuel gas burners to supplement electric power imput.

Because electric furnaces take a charge that's mostly scrap metal, they are dependent upon the vagaries of the scrap market. There are several ways to alleviate this situation. One is prerefining hot metal as a charge. Another possibility—and here is direct reduction's golden opportunity—is to use sponge iron as a feed.

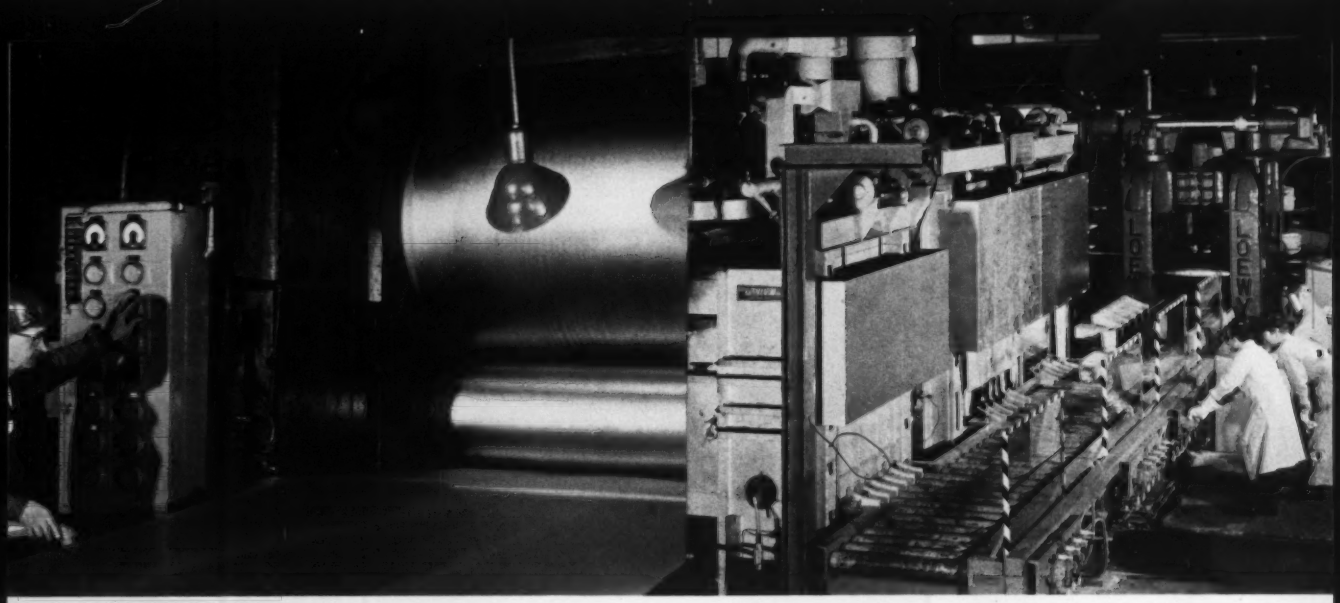
There will be more and larger electric furnaces built. "Continued improvement in ferroalloys, electrodes and refractories will assist the growth of electric-furnace steelmaking. A 300 pct increase in production over the next fifteen years is possible," concludes Dr. Langenberg.

Vacuum steelmaking will take on added importance in the years ahead. Steelmakers are increasingly aware that improvement of product quality is essential to the industry. Vacuum techniques are proving well worth the expense and effort.

Not long ago, vacuum was used only for reactive

Oil injection through blast-furnace tuyeres, Esso Research engineers find, results in lower coke rates and increased production.

U. S. steel producers will be taking another look at continuous casting units like this Concast A. G. machine installed in a Barcelona, Spain, steel plant.



Mills will be making more tailored and sophisticated products, says a Bethlehem Steel Co. spokesman.

Experimental rolling mill at U.S. Steel laboratory plays vital role in developing new steel products.

metals. But for an increasing number of applications, users are insisting on ultraclean steels. Thus, in the next few years, steels to be vacuum treated will run into the millions of tons.

Vacuum degassing is one way to remove unwanted oxygen and hydrogen from steel. One technique is to pour molten steel from the electric furnace through a high vacuum in a degassing chamber. Bethlehem Steel Co., for example, makes all hardened rolls, steam turbine rotor and spindle forgings, and other shaft forgings by this technique. Recently, a record 535,000-lb ingot was cast to be forged into a generator rotor.

Attention is now focusing on another technique—the Dortmund-Hoerder (DH) process now in trial operation at Crucible Steel Co. of America.

Using this process, Crucible degasses and alloys, under vacuum, large tonnages—full openhearth heats—in relatively short times. Quality obtained approaches that of steels melted in a vacuum but at much lower costs.

For the ultimate in cleanliness, steels are melted and poured in vacuum. "Of the current techniques, consumable-electrode vacuum melting will become most important," says J. C. Hamaker, director of research and metallurgical engineering, Vanadium-Alloys Steel Co. "It now represents about 10 pct of the specialty steels produced; it may go as high as 50 pct."

Bearing and ultrahigh-strength steels are now processed by vacuum arc melting. Tests are under way to see if tool steels and high-speed steels will also be recommended for this technique.

"Recently," adds Dr. Hamaker, "there's a trend toward consumable vacuum melting after induction melting. Currently, consumable vacuum melting usually employs air-melted electrodes."

Ideally, molten steel should be cast directly into finished products such as sheet, plate or bar. Thus, steel producers could bypass the ingot—long the source of many problems. Much of the ingot must be cropped away; soaking pits are needed for reheating; rolling mills represent major investments and high operating costs.

Though the continuous casting of finished products has not yet proved technically feasible, much progress has been made in semifinished products such as billets, and slabs.

Continuous casting, ten years ago, was earmarked for stardom. For a number of reasons, however, it never caught on in the U. S. Slab machines were too small at first. There were some doubts about metallurgical quality.

Now, because of recent successes in Canada and overseas, American steelmakers are taking a second look at the process. Its prospects are more encouraging this time. In fact, one of the largest carbon steel producers in the country is already reported to be operating a pilot plant.

The majority of the continuous-casting units will be billet machines (3-5 sq in, for example) installed in electric furnace shops. Supplying billets instead of ingots will improve their position in the specialty-steel market.

Most of the tonnage to be continuously cast will be by slab machines. Though a rate of 125 tons per hour (slab size 10 x 60 in) is about as fast as the most modern slab machine operates, it should be able to accommodate most L-D oxygen steelmaking units. And when machines will be designed to cast several slabs simultaneously, even large 400-ton openhearth heats will be continuously cast.

Another technique to bypass the ingot is now in the pilot-plant stage. In a joint venture, U. S. Steel and American Steel Foundries are determining whether semifinished products, including blooms, can be economically made by the Griffin Wheel casting process. The process was originally developed for making railroad car wheels.

"Some technical problems remain to be solved," comments Dr. Austin of U. S. Steel. "But they're not insurmountable." Costs factors still have to be settled. If they prove feasible, it's expected that the process will be adopted for several plants.

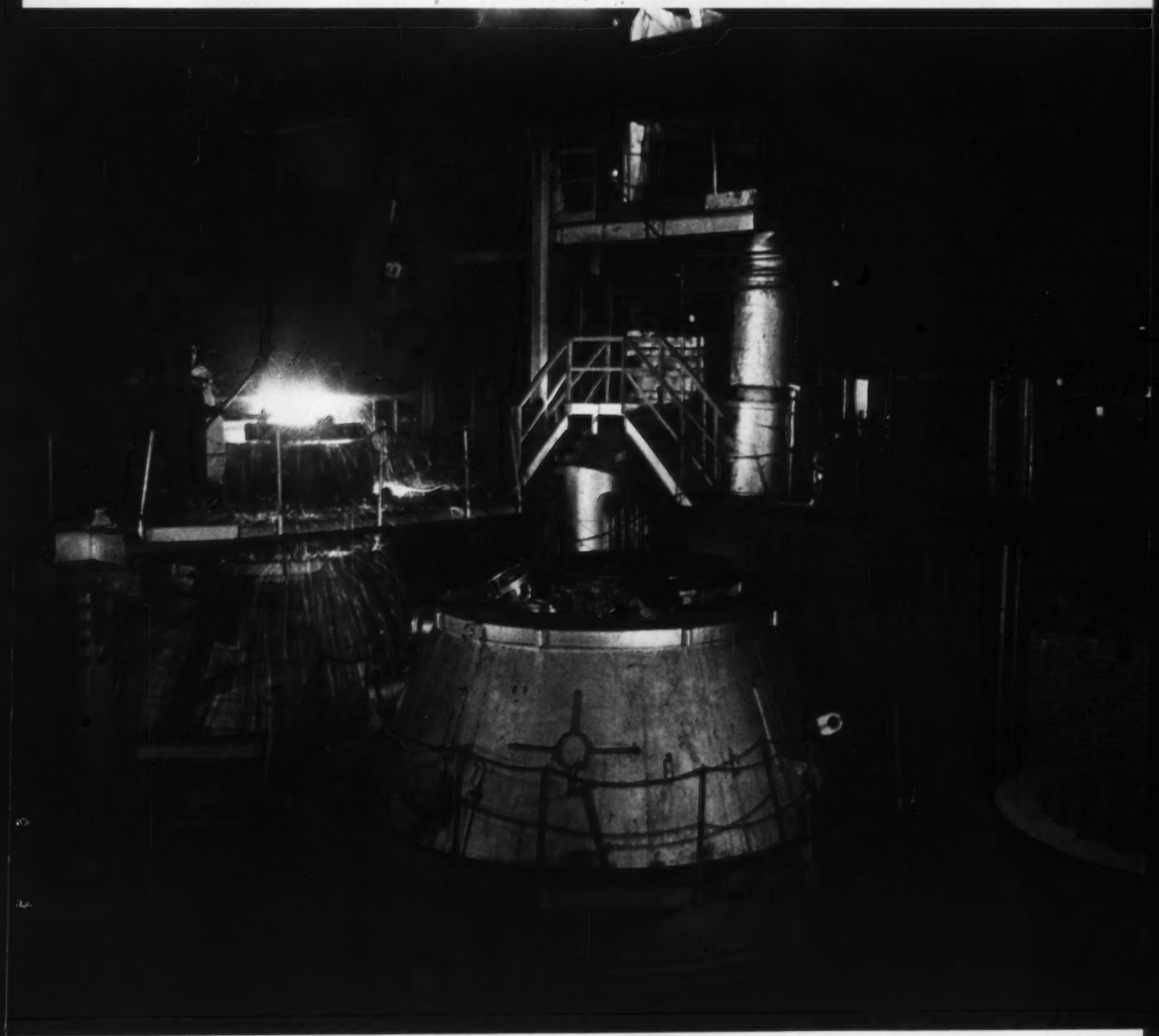
The "push-button" or computerized steel plant—where self-operating furnaces and mills make steel automatically—is not likely to be built in the foreseeable future.

"However, steps are being taken in the direction of steelmaking as a continuous rather than a step-by-step process. And this move demands greater use of controls and computers," explains R. L. Houlton, manager, process automation engineering, Industry Control Dept., General Electric Co.

The use of sinter, oxygen and fuel injection complicates the calculations. Because production rates are higher, materials handling—traffic, storage, processing, shipment—becomes a problem. Insistence on thinner gages, closer tolerances, improved quality of final product mean more controls during processing. Instrumentation to take hardness measurements or weigh metal "on the fly" must be developed.

"In the next twenty years, gains will be made in the use of controls in the steel industry that will equal or overshadow progress made over the entire sixty-year period," says Earl Browning, manager, metalworking section, Industrial Engineering Dept., Westinghouse

Molten electric-furnace steel, pouring into vacuum-degassing vessel at Bethlehem Steel Co., points up trend toward more "clean" steels.



With computer setup, technician at GE's Industry Controls Dept. can simulate steel mill systems.

Electric Corp.

Today, computers are used to control individual processes. Soon, central control systems will be developed to run several types of mills or better yet several processes simultaneously.

Notable advances have already been made in rolling facilities. The latest mills, such as Republic Steel's reversing plate mill at Gadsden, Ala., are equipped with "on-line" computers which can calculate entire rolling schedules when given raw material and end-product data. Because the "loop has been closed," the computer can recalculate the schedule if the metal does not respond properly.

Similar advances are being made, not only in the making of steel itself, but in processing—continuous annealing, ultrasonic cleaning, galvanizing, tinning.

One of the most significant developments in recent years has been the "open-coil" process. By wrapping steel strip in loose rather than tight coils, annealing proceeds much faster than normal. The process, it turns out can also be used to drastically reduce carbon content in the coiled strip. One result: a new one-coat enameling steel for appliances.

What will be the outcome of all this activity?

Certain trends are becoming very apparent. One is the general improvement in properties. Steels will be stronger, more wear-resistant, more corrosion-proof.

Another trend is the increase in the number of specialty steels. "Even the tonnage steel business is showing signs of acting like the specialty-steel business," notes John Marsh, manager of research, Bethlehem Steel Co. "Mills are making many more sophisticated and tailored items."

"The field of structurals is a good example. Consider the wide range of compositions, strengths, shapes and heat-treat conditions now available compared to those on the market years ago.

"Galvanized steel is now a family of special-purpose steels with varying finishes and coating thicknesses. There is thin tin plate, tin plate with differential coatings, vinyl clad and new porcelain enameling steels."

These are but a few of the many new developments shaping the course of future steelmaking practices. Some are evolutionary; others are revolutionary.

Whether they involve new processes or refinements of older ones, there's no question that the steel industry is headed into its greatest decade of change.

Metalworking's Technological Explosion

This article on Steelmaking is the third in The IRON AGE's new series on "Metalworking's Technological Explosion." The next subject, forming, will be covered in the Oct. 12 issue.

Reprints of this article are available as long as the supply lasts. Write Reader Service, The IRON AGE, Chestnut & 56th Sts., Phila. 39, Pa. Ask for Reprint No. 201.

First oxygen steel, July 11, 1961

New oxygen steel plant--another milestone in CF&I's "Operation Progress"

"Operation Progress" means just that at CF&I—a planned program of technological advance designed to modernize the art of steel-making.

Example: Installation of a new Basic Oxygen Steel Plant at Pueblo capable of producing approximately 100 tons of molten steel every hour. CF&I is among the first U. S. companies to adopt the oxygen process—first major breakthrough in steel-making since the design of the open hearth furnace. And this is the first plant of its type to be built in the Rocky Mountain area.

CF&I President A. F. Franz sums it up this way: "The new operation is only one of the major steps in the modernization program CF&I has undertaken during the past few years to bolster our competitive position with both domestic and foreign steel producers."

In short, "Operation Progress" is dedicated to serving you even better with the quality products you have come to expect from CF&I. 8508

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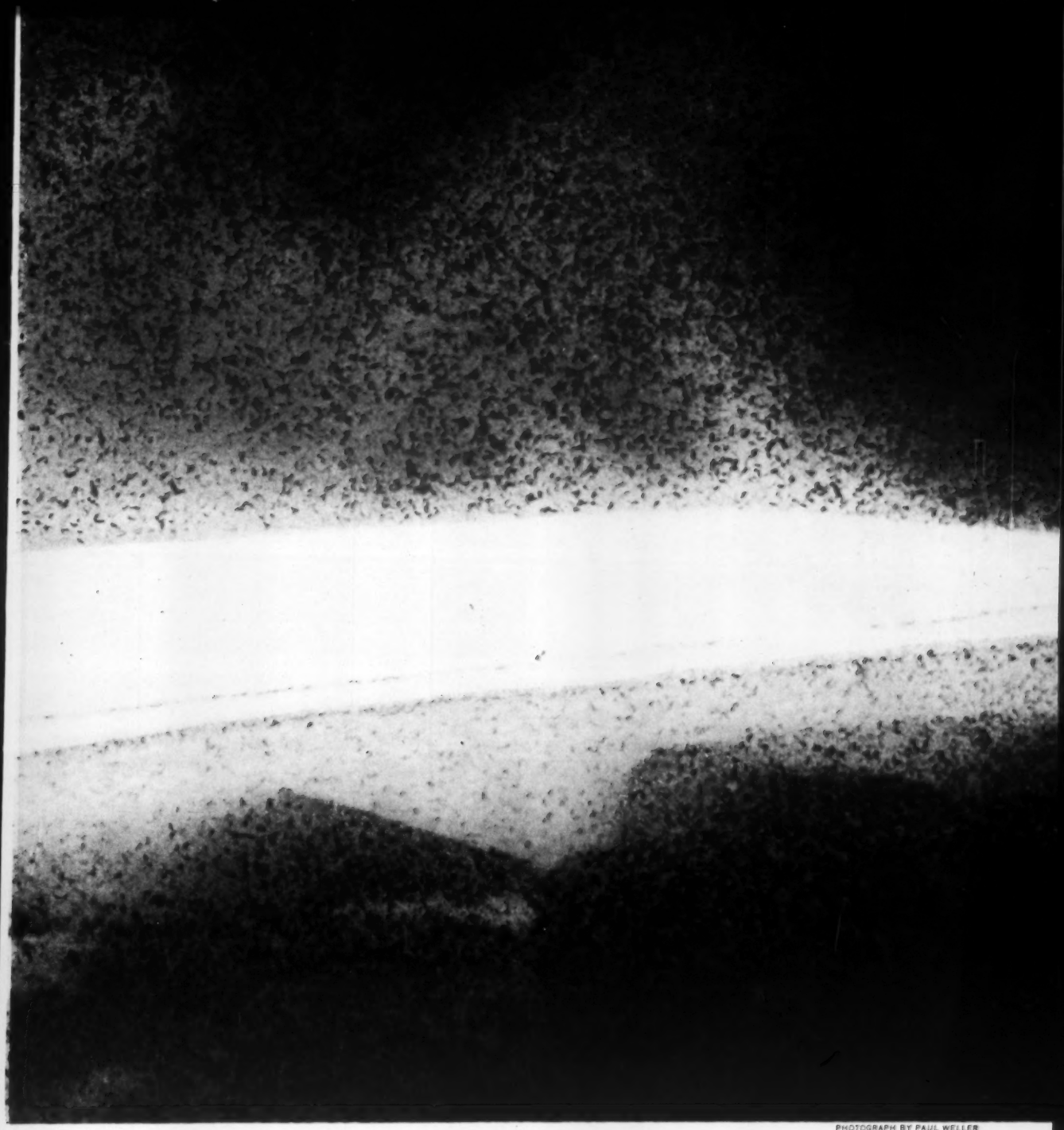

PHOTOGRAPH BY PAUL WELLER

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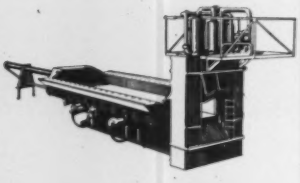

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Soviets Weld Steel to Aluminum

Tungsten-Arc Process Masters Difficult Joining Problem

High up on the list of metalworking obstacles has always been the welding of steel to aluminum. The conventional methods have never been able to solve this riddle.

The Russians are the first to announce success in this area.

■ The Russians are welding steel to aluminum. They are using tungsten arcwelding to effect the joint. The shielding atmosphere is argon. To join these metals, the steel must be galvanized first.

Apparently, the development is beyond the laboratory stage. It's reported that aluminum cable has already been welded to steel plate. Other examples include steel plate to aluminum-5 pct magnesium alloy sheet and aluminum alloy railings to steel frames in shipbuilding.

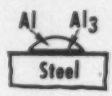
These developments were reported recently in a Russian magazine on welding by G. A. Belchuk. Several years ago, this engineer announced less conclusive findings on the same subject.

Triple Layer—In 1959 Belchuk described two ways to weld steel to aluminum. Both methods employed tungsten arcwelding with an argon shield. In the first method, three layers of aluminum were deposited on aluminized steel. The aluminum coating was 0.04 in. thick.

Both filler wires, one aluminum and the other tungsten, were 0.078 in. diam. Welding current was 110-130 amp and travel speed was 4.7-9.4 ipm. A well developed layer of intermetallic compound (0.04-0.05 in. thick) was detected at the aluminum-to-steel junction. This junction was as strong as aluminum.

In the other experiment, aluminum was deposited in the same manner on galvanized steel. Here, the layer of zinc was 0.008-0.016 in. thick. Once again, a layer of intermetallic compound formed. This time the layer was only 0.001

Fillet Welds Require Correct Speeds

Specimen No.	Type of Specimen	Welding Current, amp	Travel Speed, ipm	Fracture Load, lb	Cross-Sectional Area of Fracture, in.	Tensile Strength, psi
1. Bead consists entirely of $FeAl_3$		130	3.2-3.8	1870	0.95 x 2.6	780
				3400	0.90 x 2.8	1400
2. Wide band of $FeAl_3$ with $FeAl_3$ inclusions in the bead		130	3.7-4.6	5700	1.10 x 2.8	1900
				5100	1.00 x 2.8	1900
				3700	0.79 x 2.8	1700
3. Thin band of $FeAl_3$ with no inclusions		100	8.2-10.2	1650	0.79 x 2.8	780
				1540	0.67 x 2.6	910
				2300	0.71 x 2.8	1180
4. Thin band of $FeAl_3$ with no inclusions		130	9.2-9.9	1760	0.71 x 2.8	910
				2200	0.79 x 2.8	1000
				1760	0.87 x 2.8	740
5. Band of $FeAl_3$ is difficult to detect		140	15.0-19.0	440	0.79 x 2.4	240
				1320	0.87 x 2.8	560

in. thick. The joint, however, was not as strong as the first joint.

These earlier tests indicated that weld joints could be effected between aluminized or galvanized steel and aluminum using the inert-gas tungsten-arc process. Incidentally, butt joints were made without "buttering" the edges.

Easy Does It—The latest work in this area discloses that externally sound joints are easy to make. There is a problem with the intermetallic compound ($FeAl_3$) at the junction of the weld and the steel. There, the layer is brittle and likely to crack.

The intermetallic phase is formed by a diffusion reaction. This occurs when liquid aluminum reacts with hot solid iron along the line of contact.

To produce a weld joint between galvanized steel and aluminum, you must take extra precautions to protect the hot surface of the steel from oxidation. This is done by cleaning the steel, then galvanizing it by hot-dip or electrolytic methods. The zinc layer should be about 0.008-0.016 in. thick.

Proper welding procedure is shown in the drawing atop the next page. The arc vaporizes the zinc as the aluminum coats the hot, clean steel. A layer of intermetallic compound forms at the line of contact. An earlier research project in the Soviet Union showed that even 2-3 pct aluminum will replace zinc from the iron-zinc compound.

Four Choices—Four possibilities arise in depositing aluminum on steel. All of them are depicted on the preceding page. Both the first and last possibilities are limiting cases.

The effect of welding procedure on bead thickness and the $FeAl_3$ layer was determined on two types of plate. Both steels had 0.016-in. thick coatings of electrolytic zinc. One steel contained 0.23 pct C, 0.55 pct Mn and 0.20 pct Si. The other steel contained 0.75 pct Cr, 0.5 pct Ni and 0.4 pct Cu.

Plate sections were 4 x 3 x ⅛ in. thick. An aluminum filler wire, 0.078 in. diam, was used. The wire contained 0.26 pct Fe and 0.19 pct Si. In physical properties, the wire had a tensile strength of 10,800 psi, an elongation of 36 pct and a reduction of area of 61 pct.

Welding was performed in accordance with the drawing atop the next page. Alternating current was used. A ballast rheostat controlled the direct-current component. It was found that a travel speed of 4-9 ipm was sufficient to secure a thin $FeAl_3$ layer only 0.0004-0.006 in. thick.

Variety of Joints—Butt and tee joints were made in the 0.75 pct

Butt Welds as Strong as the Aluminum

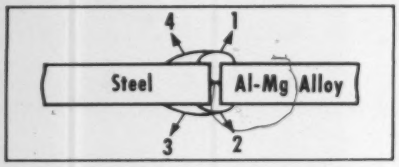


Plate dimensions for both steel and aluminum alloy were identical: 8 x 4 x ⅛ in. thick. Zinc coating on steel was 0.0016 in. thick. Steel was Russian-type SK_HL-4. Aluminum alloy contained 5 pct magnesium.

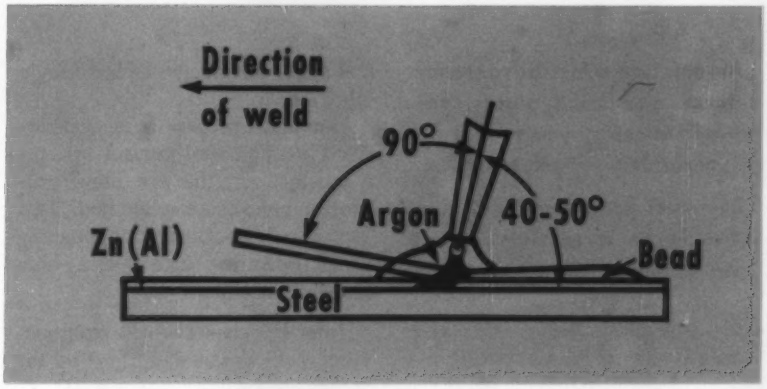
Welding Conditions	Fracture Load, lb	Type of Fracture		Tensile Strength, psi	
		Location	Dimensions, in.	Joint	$FeAl_3$ Layer
1st Bead = 2.2- 2.6 ipm	9300	$FeAl_3$	4 x 3/4	———	3000
2nd Bead = 3.4- 3.8 ipm	5300	Joint	4 x 1/8	11,300	———
3rd Bead = 14.4-16.4 ipm	10,300	Joint	4 x 5/32	16,600	———
4th Bead = 14.4-16.4 ipm					
1st Bead = 3.9- 4.6 ipm	7700	Joint	4 x 1/8	16,500	———
2nd Bead = 6.6- 7.9 ipm	8500	Joint	4 x 9/64	15,600	———
3rd Bead = 10.5-11.8 ipm	8400	Joint	4 x 9/64	15,400	———
4th Bead = 14.4-16.4 ipm	6700	Joint	4 x 1/8	14,500	———
	9600	Joint	4 x 5/32	14,200	———
	7100	Joint	4 x 1/8	15,100	———

Cr steel. Plate for butt joints was 8 x 4 x ⅛ in. thick. These dimensions were the same for both the steel and the aluminum alloy. The steel plate had a zinc coating of 0.0016 in. The aluminum alloy contained 5 pct magnesium.

Steel plate for the tee joints were first buttered with three layers of aluminum. The beads were cleaned. Then the steel was welded to the vertical aluminum-alloy plate. The tables on the first and second pages show the strengths of these joints. All fillet welds failed in the $FeAl_3$ layer.

The best welding conditions are 110-130 amp at travel speeds of 3.9-4.6 ipm. Under these conditions, the layer of intermetallic compound is less than 0.006 in. thick. At higher travel speeds, the thickness of the layer and the strength both decrease. Corrosion tests in synthetic sea water showed no failures.

How Welding Was Performed



The welding of steel to aluminum is the subject of a current project at the Frankford Arsenal, Philadelphia. Early reports indicate that the two metals can be welded by a variety of processes.

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Medium Travel Speeds Are Effective

Thickness and Microhardness Measurements

Welding Current, amp	Travel Speed, ipm	Bead Dimensions, in.		Thickness of $FeAl_3$ Layer, in.	Microhardness, kg per mm²	
		Width	Thickness		$FeAl_3$	Bead
100	3.7	0.39	0.11	0.0004	300-380	36
100	3.8	0.55	0.079	0.001	350-420	36
130	3.9	0.71	0.087	0.002	420-420	39-42
140	3.85	0.71	0.059	0.006	420-460	52-57
130	3.2	0.79	0.039	0.039	720-820	720-820
130	4.9	0.63	0.13	0.002	420-420	39-42
130	9.0	0.43	0.087	0.0004-0.0006	350-380	36
140	15.3	0.32	0.079	0.0002-0.0006	230-380	36
140	19.1	0.28	0.071	0.0002-0.0004	380-380	37

Computers Enter Small Shops

Automation offers advantages in large and small plants. But for full benefits, you've got to use computer programming.

Low-cost programming is now available as a service for all types of numerical controls.

■ Computers are filling more and more roles in the metalworking industry. Low-cost computer programming is now within reach of small- and medium-sized plants. A new programming package also offers major advantages to large-scale fabricators.

Automatic programming of diversified machine-tool control systems is possible with this new numerical-control programming method. This "software" package automatically yields operating data for a wide range of machine tools.

Joint Efforts—The new programming method was developed by the Rohr Aircraft Corp., Chula Vista, Calif., and the Remington Rand Univac Div. of Sperry Rand Corp. It's used with a medium-scale general-purpose digital computer.

An inherent feature of the programming package is its ability to guide the control devices of various machine-tool builders. Until now, most computer programs were designed to prepare instructions for one machine-tool control only. Since the majority of these programming methods are proprietary, their use is limited to the companies which developed them.

Too often, even large-scale fabricators aren't happy with their present programming methods. Why should they have to use separate programs to prepare instructions for each type of machine-tool control?

Expenses Spiral — The cost of such programming methods tends to mushroom. Only a large company with a battery of work-alike N-C tools can fully justify these costs.

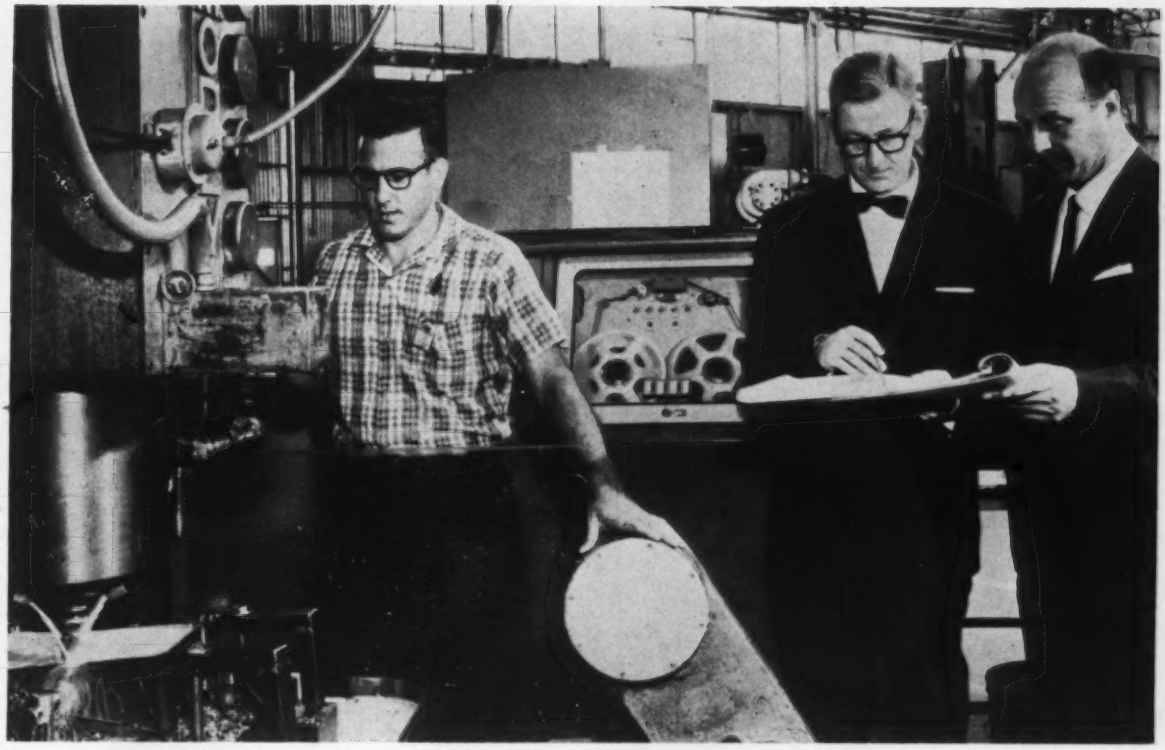
But what happens if the purchasing department orders another breed of machine tools? Can the controls on these new tools be actuated by one of the company's present programming packages? If not, additional computer-programming costs become the order of the day.

Frequently, a company rejects a needed machine tool because the cost of programming instructions for the tool is prohibitive. With the new Univac software package, this programming bottleneck melts away.

Major Savings — In announcing the programming development, D. L. Bibby, president of Remington Rand, reports: "At Rohr Aircraft Corp., a single Univac solid-state computer proves the effectiveness of the new programming method. It's piling up manufacturing cost savings of almost 70 pct in the production of aircraft parts."

Rohr uses the computer an average of one hour per day for all N-C part programming. During its off hours, the versatile computer con-

EXPERTS CONFER: Dr. Gastone Chingari of Remington Rand, left, and Niles Olesten, N-C supervisor at Rohr Aircraft, check a finished part.



FLAW FREE: The new numerical-control programming method insures precision on complex shapes.

tinues to earn its keep.

It handles production controls, billing accounts receivable, sales analysis and inventory-control operations. In essence, the computer coordinates these functions into a single, unified processing system.

Real Workhorse—Now, let's see how the computer serves Rohr's shop personnel. It feeds programmed data into nine totally-different automatic machine tools. These tools are guided by the following patented control devices: Bendix, Cincinnati, Digimatic, Numericord and Thompson Ramo Wooldridge.

Programming begins with a part-programmer's manuscript. This is a simple statement of manufacturing data. It's prepared from an engineering drawing.

Cards are punched from the coded manuscript. Then the cards feed into the computer where they're interpreted. Next, the computer prepares the control media for the automatic machine tools.

Using the computer-calculated input data, continuous-path machine tools readily turn out complex shapes. The computer's ultrahigh speed permits the rapid definition and encoding of thousands of instructions. These minutely-detailed instructions, in turn, allow the machine tools to shape hard-to-form contours to tight tolerances.

Calls Signals—Among the machines that are automatically guided by computer-generated data at Rohr are: A Giddings and Lewis profiler, several Morey vertical profilers, a couple of Cincinnati skin mills and a Cincinnati traveling column. These machines produce complex airframe parts such as blowout doors, firewall supports, longerons and midspar fittings.

The computer's high-speed read-out system sorts and verifies up to 600 cards a minute. Control-media printing takes place at rates up to 600 lines per minute.

A total of 51 printed characters are used in the computer's printing system. These printed characters include 10 numeric, 26 alphabetic and 15 special duty. They're printed on a line that's 130-characters wide. For machines which can't accommodate input cards, all data are converted to tape form.

Print spacing is 10 characters per inch, horizontally, and six or eight lines per inch vertically. You can choose any desired format.

One Plus One—The computer performs up to 1,176,470 additions or subtractions per minute. Occupying only 500 sq ft of floor space, it can store 125,400 digits.

Mr. Bibby also reports the Univac Division is developing an automatic programming system for the recently-announced Univac 1107 Thin-Film Memory Computer. Memory-access speeds for this computer are measured in billionths of a second. This is about 1000 times faster than the fastest computers now in service.

Univac plans to make both numerical-control programs available without cost to all users of the company's solid-state computers.

Screw Feeder Raises Ore Yield

Separating iron from crude ore at J & L's Benson Mine requires the use of the flotation process.

Here, a special feeder unit helps to pull the last bit of value from the trailings.

■ Low-grade iron ore such as martite requires a good bit of processing before its valuable sintered by-product hits the blast furnaces.

Jones & Laughlin Steel Corp.'s Benson Mine, Star Lake, N.Y., produces just such a low-grade crude. The deposits actually sort out into two types: magnetite and martite.

Which is Which?—The magnitite, being magnetic, attracts from unwanted matter quickly with the use of magnetic separators. Martite, on the other hand, is nonmagnetic. Its reduction to a high grade requires the use of two highly critical recovery processes.

Huge chunks of martite are hauled from the mine, crushed, then ground into very fine particles. The particles are then pumped to spiral separators. Gravity separates most of the usable iron from the waste.

The spiral rejects retain enough value to require still another extraction process called flotation. Tailings are placed in a large mixer along with several reagents. All are liquid with the exception of one—sodium fluoride. The liquids include fuel oil, fatty acid, sulfuric acid and water.

Feed: The Key — The sodium fluoride is a dry powder and its feed control is the key to producing a low phos product from the flotation process. Exact amounts of powder are metered into the slurry by means of a Vibra Screw Feeder.

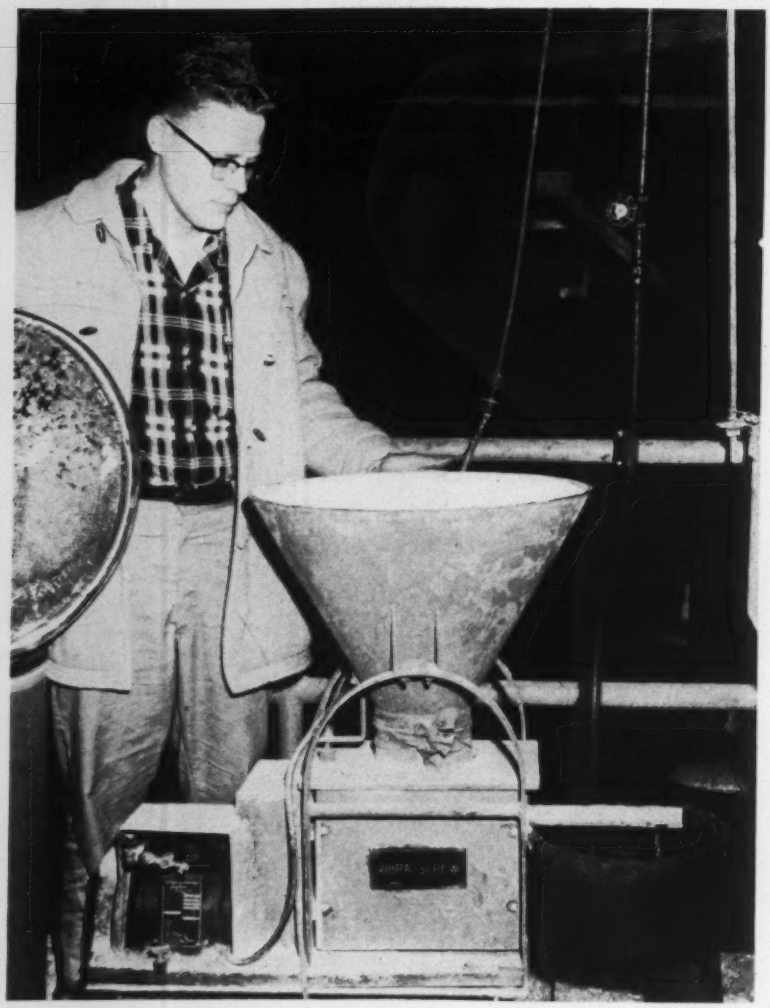
Once the trailings are conditioned, they're dumped into flotation cells. Air is introduced into the mixture. With the introduction of air, the iron mineral floats to the top of the mixture in the form of a black, oily froth.

The froth is swept into cleaning tanks and ends up as a valuable concentrate. The flotation process actually salvages about 3,000 tons of concentrate per month—well worth the effort.

Adds Sodium Fluoride — Close control of the addition of sodium fluoride is required to maintain a low phos content. Too much and it interferes with the flotation of the iron. Too little, on the other hand, causes a high phos waste ingredient called apatite also to float to the surface with the iron.

The screw feeder affords the necessary control required to produce a low phos product which would otherwise be harmful in making steel, since its presence makes the steel brittle, hard to work, structurally weak and prone to split.

The iron from the flotation process is added to the gravity-separated martite. It is then sintered and sent to the blast furnace. The original low-grade crude contained 22-pct iron by weight. As processed sinter, it analyzes to 62-63 pct iron.



ADDS NaF: Sodium-fluoride powder feeds into the large mixer sending valuable iron to the surface and useless apatite to the bottom.

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Closeup of the massive automatic feed drive for the Clearing production system above.

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AISE CONVENTION

Steel Experts Meet

■ Members and guests of the Association of Iron and Steel Engineers will gather Monday, Sept. 25, at Pittsburgh's Hotel Penn - Sheraton for their 1961 Annual Convention. Registration and a business meeting kick off the proceedings, followed by the technical sessions outlined below. A trip to Armco Steel Corp., Butler, Pa. is planned for Thursday.

AISE TECHNICAL SESSIONS

Monday, Sept. 25

Electrical Session: 9:30 am

"Recent Developments and Operating Experience in Control of Gage and Set Up of Strip Mills."

"On-Line Computer Control for a Reversing Plate Mill."

"Controls and Instrumentation for New Sintering Plant."

Joint IHEA and AISE Session on Continuous Furnace Processing: 9:30 am

"Continuous Strip Annealing."

"Continuous Heat Treatment of Steel Plate."

"Continuous Strip Galvanizing Development."

Operating Practice Session: 2:00 pm

"Continuous Galvanizing Practices and Trends."

"Recent Developments in Strip Thickness Control."

"Strip Processing."

Lubrication Session: 2:00 pm

"Crane Rail Lubrication."

"Effect of Fire-Resistant Fluids on Design and Operation of Hydraulic Systems."

"The Selection and Evaluation of Rolling Oils."

Tuesday, Sept. 26

Electrical Session: 9:00 am

"Electrical Protection on High Capacity Systems."

"Application of Circuit Breakers with Symmetrical Ratings in Steel Mills."

"Electrical Lockout Procedures."

Combustion Session: 9:00 am

"Gas Analysis Applied to Blast Furnaces."

"Computers in Fuel and Utilities Dispatching."

"Modern Blast Furnace Blowing and Gas Recovery Systems."

Blast Furnace Session: 2:00 pm

"The Injection of Auxiliary Fuel into the Blast Furnace."

"Natural Gas Injection at Great Lakes Steel Blast Furnaces."

"Sintering Fans—Selection and Design Considerations."

Rolling Mills Session: 2:00 pm

"Technological Exploitation of the Stretch-Reducing Process."

"Design and Performance of Recent Developments in Bar Mill Cooling Beds."

"Pass Reduction Schedule for Optimum Production from Hot Strip Mill."

Wednesday, Sept. 27

Electrical Session: 9:00 am

"Motor Heating Effects of Reactor Type Control Systems for A-C Cranes."

"Something Different in Reactor Crane Control."

"The Crane of the Future."

"The A-C Mill Motor — A New AISE Standard."

Combustion Session: 9:00 am

"Nitrogen from an Air-Separation Plant as a Heat-Treating Atmosphere."

"The New 5-Zone Slab Heating Furnace at Campbell Works, The Youngstown Sheet and Tube Co."

"New Pits at Acme-Newport Steel Co."

Mechanical Session: 2:00 pm

"Welding—A Versatile and Economical Tool in Steel Mill Maintenance."

"Steel Mill Service Water Studies."

"Design Considerations for Belt-Conveyor Systems"

Operating Practice Session: 2:00 pm

"Capital Investment and Productivity Measurement."

"The Changing Open Hearth."

"Noise Control in the Steel Industry."

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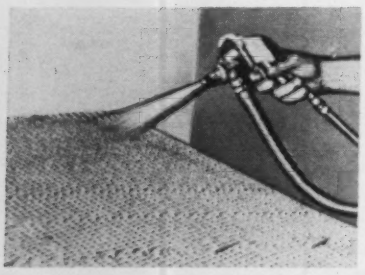
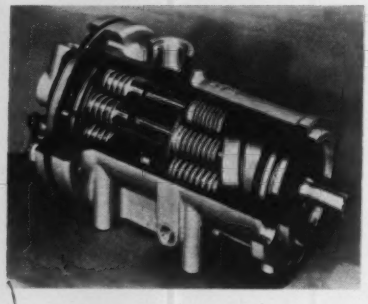


Spray-On Adhesive Yields High-Strength Bonds

Here's a new high-strength, heat-resistant adhesive that sprays on in a relatively-dry form. Contact pressure is all that's needed for bonding a wide variety of materials. These include: polystyrene, sheet plastic, steel, aluminum, wood, particle board and foamed glass. Because of its good filleting properties with the new spray techniques, the rubber-base adhesive is ideal for fabricating honeycomb sandwich panels. Other uses include bonding building or metal panels. (Minnesota Mining & Mfg. Co.)

For more data circle No. 20 on postcard, p. 247



Hydraulic Pump Provides High-Overall Efficiency

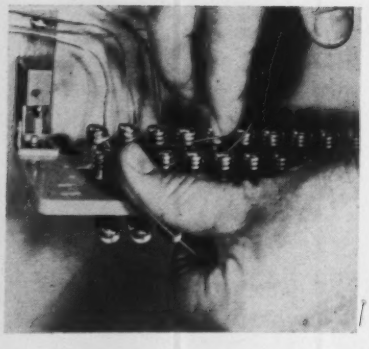
The unusual control versatility of a new hydraulic pump results from its balanced cylinder-block design and wobble-type reaction plate. This almost eliminates pumping forces from the displacement-changing mechanism. Reaction pistons serve to balance the hydraulic forces exerted on the cylinder during pumping. Direct cylinder-block actuation at a low-force level accounts for fast response and stable control of pump output. A non-rotating cylinder block does away with centrifugal forces. The result is a real increase in maximum-speed potential. (The Weatherhead Co.)

For more data circle No. 21 on postcard, p. 247

Low-Cost, Dry-Potting Compound Dissipates Heat

Primarily designed for easy, low-cost potting, this one-component, epoxy-based material handles much the same as a dry, coarse powder. It requires no preparation prior to use. Named Dri-Cast, the powder boasts outstanding electrical characteristics and exceptionally-high thermal conductivity. After curing, this conductive property greatly aids in dissipating heat around transformer windings. In addition, linear shrinkage is less than 1 pct. Thermal and physical shock properties are also excellent. These features make the new epoxy attractive for a variety of potting uses. Two types are available. The first is blue in color with a high-density and packing factor. The second is green and of a more porous nature. It serves as a matrix for oil impregnation. (Hysol Corp.)

For more data circle No. 22 on postcard, p. 247

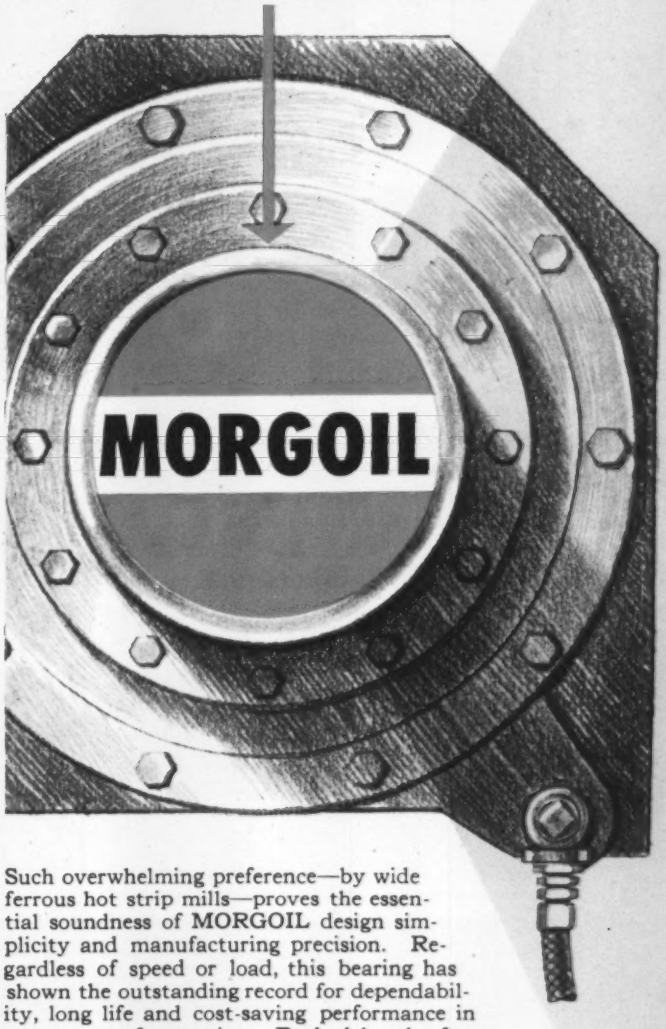


Spring-Type Device Speeds Insulated-Wire Hookup

Although it looks like a coil spring, this device is actually a new-type electrical connector. It's expected to supplant the familiar binding-post and nut arrangement used to connect telephone wires in terminals. With the coil-spring connector, wires can be hooked up rapidly, without initial stripping of insulation. Here's the principle of operation. The spring wire is square, instead of round or oval. When insulated wire is looped around the spring once, and pulled tight, it forces its way between two turns of the coil. Sharp, square, connector edges bite through the plastic insulation and contact the wire. (Bell Telephone Laboratories)

For more data circle No. 23 on postcard, p. 247

28 MORE HOT STRIP MILLS SINCE 1955 HAVE GONE TO



ALGOMA STEEL
ALPINE MONTAN
AUGUST THYSSEN
COLVILLES
CRUCIBLE STEEL – MIDLAND
DOMINION FOUNDRIES & STEEL
DOMNARFVETS
FORD MOTOR COMPANY
FUJI IRON & STEEL
FUNDIDORA
GREAT LAKES STEEL
GUSTAVE BOEL
HINDUSTAN STEEL
KAWASAKI IRON & STEEL (2)
KLOECKNER WERKE
REPUBLIC STEEL – GADSDEN
REPUBLIC STEEL – WARREN
RICHARD, THOMAS & BALDWINS
SALZGITTER
SOCIEDAD MIXTA SIDERURGIA ARGENTINA
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PARTIAL LIST OF INSTALLATIONS SINCE 1955

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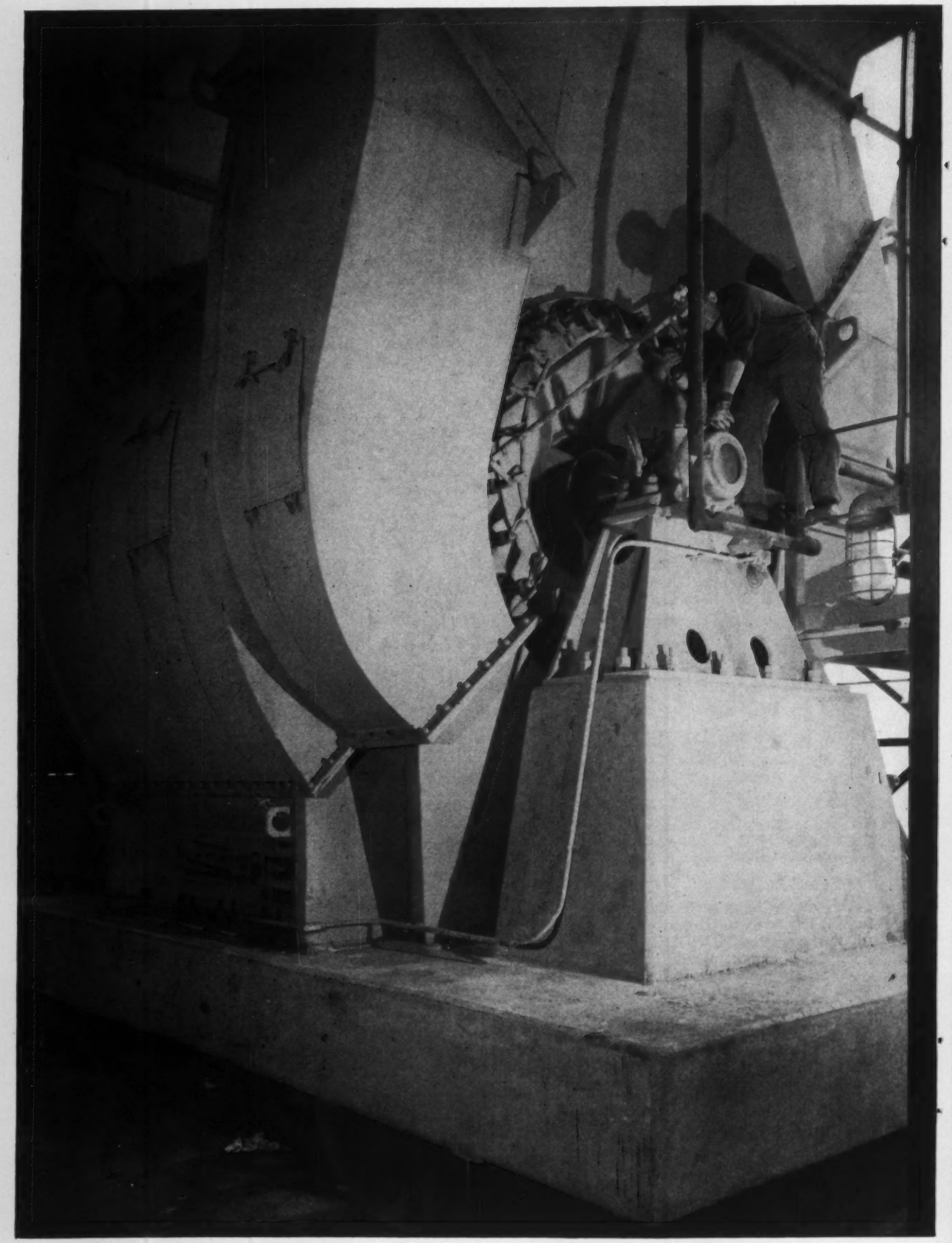
WORCESTER, MASSACHUSETTS

ROLLING MILLS • MORGOIL BEARINGS • WIRE DRAWING MACHINES • COMBUSTION CONTROLS



RD Fan used for induced draft on basic oxygen furnace of large steel producer. There are four identical units, each producing 325,000 cfm against a static pressure of 15" wg at 550° F.

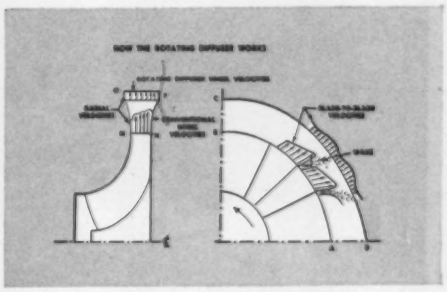
JOY RD FANS CAN PROVIDE PRESSURES UP TO 4.5 PSI AND CAPACITIES UP TO 600,000 CFM

Joy RD Centrifugal Fans, based on a new concept in fan design, can provide any volume of air or gas at pressures up to 4.5 psi in a single stage. This means important savings in initial cost. An equally important saving is their high efficiency over a wide range of volume, which is especially important where load fluctuates. Surging, even on parallel operation, is no problem because the RD Fan is inherently resistant to pressure surge over its entire duty range.

These advantages of the RD Fan are the results of its unique rotating diffuser. Instead of stationary diffusers, the RD diffuser is an integral part of the wheel—added at the blade tips. The rotating diffuser reduces the gas velocity before leaving the wheel and up to 98% of the conversion of velocity to pressure is accomplished with the wheel of the RD Fan.

Radial blades in the RD Fan tend to be self cleaning, even when handling dust laden and dirty gases. The rotating diffuser results in low noise levels because of the lower and more regular velocities leaving the wheel and because the blade tips are remote from the cut-off.

The Joy RD Fan is finding steady acceptance in induced draft and forced draft applications in the steel and power industries, in handling chemical process gases, and in heavy duty industrial applications. For extremely dirty or corrosive applications the entire unit may be fabricated of stainless steel. Parts are simple because there are no large castings or close running tolerances. For complete information and duty areas of the RD Fan, write for bulletin 3449-48.

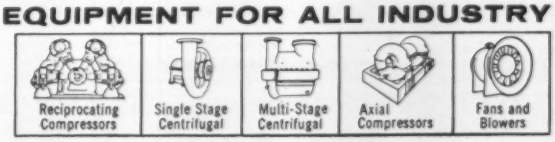


HOW THE ROTATING DIFFUSER WORKS

Studies have shown that radial velocities leaving conventional wheels are unequally distributed, as shown in MN. Also there is fluctuation in the blade-to-blade velocities based on $\frac{nN}{60}$ where n is the number of blades and N is the speed in rpm. The Rotating Diffuser reduces the gas velocity before leaving the wheel, which allows more uniform flow as shown at OP and CD. Without the rotating diffuser, velocities are much higher and erratic as shown at AB and MN, causing turbulence, friction losses.

Joy RD Fan at eastern CO_2 plant. Unit has capacity of 27,800 cfm, at 3 psi. Drive is a 450 hp steam turbine.

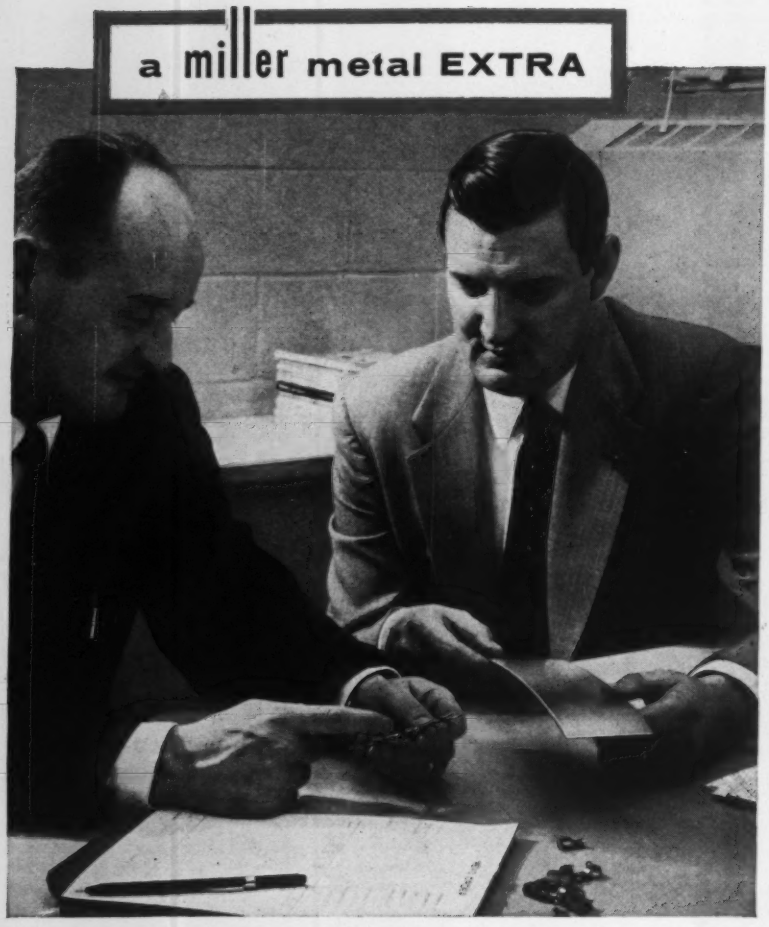
AIR MOVING EQUIPMENT FOR ALL INDUSTRY



JOY

Joy Manufacturing Company
Oliver Building, Pittsburgh 22, Pa.

In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario



problem-solving, profit-producing

APPLICATION ASSISTANCE

Miller's sales representatives are not just experts on special metals, they're experts in applying them, too. They "work" for each of their customers, helping to select the alloy that's exactly right for each particular application. Chances are *your* Miller representative, backed by sales and service experts at each mill, can help you solve your toughest design and production problems. Make sure your next order includes expert technical help, meticulously produced high-grade metal, and dependable delivery. For brass, bronze or nickel-silver strip, copper or copper-alloy tube in special shapes and sizes, call on the specialists at Miller . . . where you're a name, not just a number on the job ticket.

ROLLING MILL DIVISION
Meriden, Connecticut

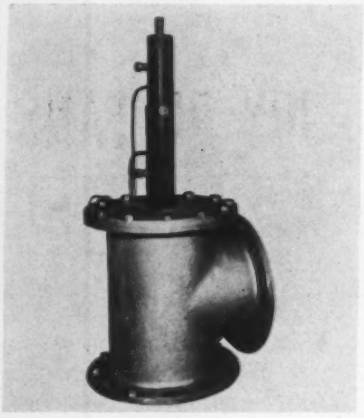
miller SINCE 1852

Tube Subsidiary
A. H. WELLS, INC.
Waterbury, Connecticut

DESIGN DIGEST

Vacuum Valves

These right-angle, O-ring-sealed valves are made from cast-stainless steel. Their effective motion seal

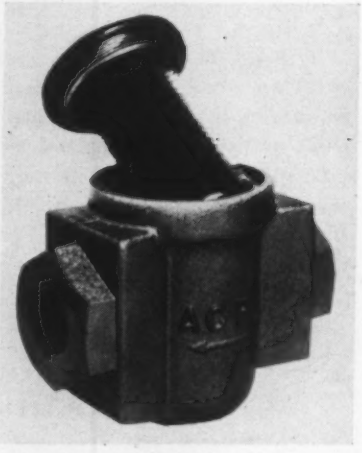


consists of two O-rings, with a space between them. This cavity is evacuated by a mechanical pump. The resulting seal allows for high conductance, since the plate can be raised completely out of the path of the gas flow. All of the valves in the line are available for hand or pneumatic operation. Sizes range from 4-12 in. ID. (F. J. Cooke, Inc.)

For more data circle No. 24 on postcard, p. 247

Cleans Machine Oil

Gasoline and lubricants stay in check with a new line of permanent magnetic filters. The filters re-



move both magnetic and nonmagnetic particles. This includes sand, slag, fibers, scale, cellulose, asphalt

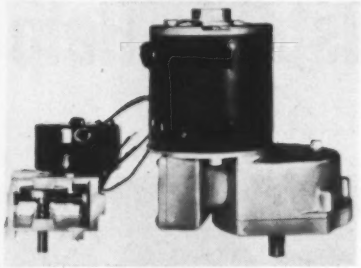
and brass. It's claimed that the filters are easily cleaned, last for the life of the machine, and filter impurities down to the size of 0.1 micron. (Combined Agencies Corp.)
For more data circle No. 25 on postcard, p. 247

Pipe Fittings

A new O-ring, pipe-thread fitting has recently been added to a line of hydraulic fittings. The O-ring units are available for pipe sizes from ½-3 in. They join the pipe to flange-type connectors, eliminating thread-type connections. The result is unusual flexibility in pipe and tubing assemblies. (Anchor Coupling Co., Inc.)
For more data circle No. 26 on postcard, p. 247

Gear Motors and Boxes

Subfractional-horsepower gear motors and gear boxes for original equipment are now available with



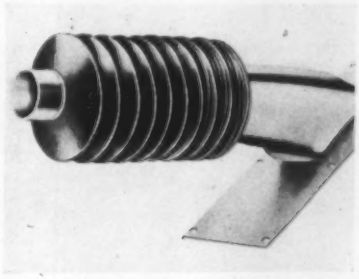
right-angle reduction gears. Single, double and triple reductions can be made. Ratios range from about 4:1 to over 100,000:1 Depending on the requirements, permanently-sealed, conventionally-closed or skeleton units can be designed for each application. The unit's precision-machined housings are made from castings, extrusions and stampings. (Spiroid Div., Illinois Tool Works, Inc.)
For more data circle No. 27 on postcard, p. 247

Low-Cost Disk Brake

Designed for a wide range of industrial-machinery and for small vehicles, a low-cost disk brake has a torque-capacity up to 9000 in.-lb. Its kinetic-energy capacity ranges up to 1-million ft-lb. The new brake can be applied by hydraulic or pneumatic action. A universal-mounting configuration allows mounting of the brake housing on almost any existing support. (The Goodyear Tire & Rubber Co.)
For more data circle No. 28 on postcard, p. 247

Heat-Resistant Sleeve

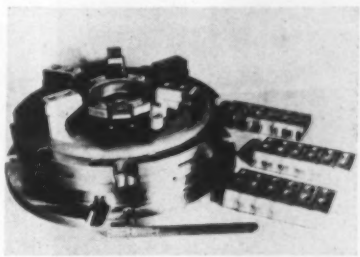
A newly-developed, silicone-coated, fiberglass material is broadening the range of applications for



pliable, accordion-type protective sleeves. It resists temperatures to 450°F, and flexes normally at –80°F. Major uses for the material are on heat ducts and in hot-gas transfer between intake and exhaust assemblies of industrial furnaces. (A & A Mfg. Co., Inc.)
For more data circle No. 29 on postcard, p. 247

Air-Operated Chuck

An air-operated diaphragm is the key to a new high-speed chuck. The workpiece is chucked and released by compressed air operating on a piston which flexes the steel diaphragm. This opens the jaws the necessary few thousandths of an inch. Chucks are made in the



following sizes: 5½-in. diam., three jaw models; 7-in. diam., four jaw; and 10-in. diam, six jaw sizes. (Erickson Tool Co.)
For more data circle No. 30 on postcard, p. 247

Converts Current

Here's a direct-current transmitter with an unusual function. It

Capacability means

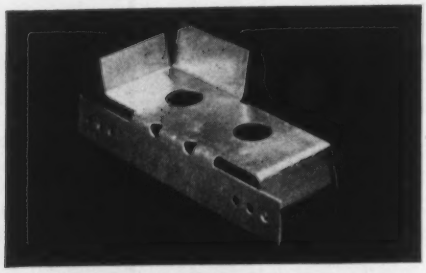
Readiness

When it comes to refractories, *readiness* is Basic. You won't have to be "on guard" against slow shipments when you rely on Basic. Steelmakers know its eight plant network stands ready to supply a complete line of granular and tar-bonded refractories at the flick of a finger.

Supporting the company's main plant at Maple Grove, Ohio are other facilities in Ohio, Indiana, New York and Nevada. With the largest resources in the granular basic refractory industry, Basic has an annual capacity of well over a million tons.

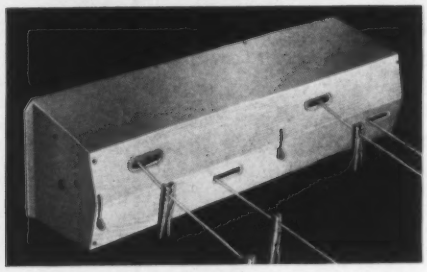
If you use basic refractories, you can depend on Basic's *capacity* and *ability*. Write for 24-page booklet outlining application of Basic's more than thirty dead-burned dolomites, ramming and gunning refractories, patching materials and tar-bonded linings for basic oxygen furnaces.

BASIC INCORPORATED
845 HANNA BUILDING
CLEVELAND 15, OHIO

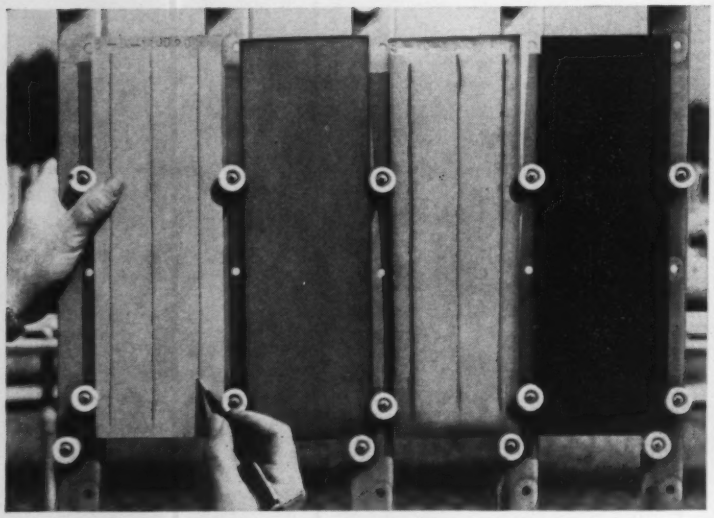


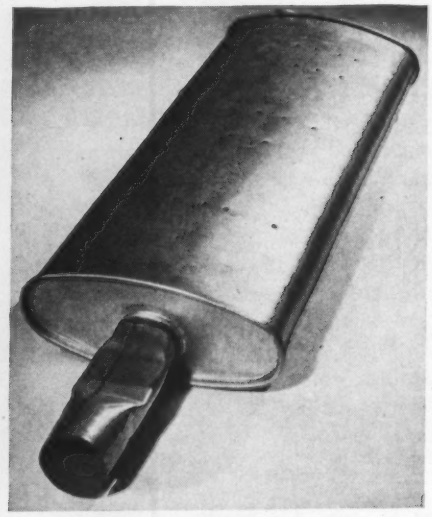
Armco ZINCGRIP Steel

Armco ALUMINIZED STEEL Type 2



5 Armco Coated Steels Can Help





Armco ALUMINIZED STEEL Type 1

Steel

This label identifies modern, dependable steels in your products

After 3-years' exposure outdoors, paint holds tightly to ZINCGRIP A, PAINTGRIP (far left). No rust even where scratched. No rust on the unpainted sample, either (second from left). Samples on the right are phosphate-treated cold-rolled steel, one painted, the other unpainted. Paint has suffered. Rust is evident on the unpainted sample.

1. NEW ARMCO ZINCGRIP® A, PAINTGRIP®. This *new* kind of hot-dip zinc-coated steel is specially prepared to take a paint finish that's every bit as attractive as a paint finish on cold-rolled steel! It's *spangle-free*, holds paint *tighter and longer*, permits *twice as many spot welds* as ordinary galvanized before electrode tips need redressing. It's available *now* in commercial quantities.

2. ARMCO ZINCGRIP STEEL has a tightly adherent zinc coating that gives products durable protection at an *average cost of about 2⅓ cents per square foot.* Savings: About .92 cents per square foot over typical cost of painting. The door part pictured, for example, was previously fabricated from cold-rolled steel, then painted for protection. It is now made of Armco ZINCGRIP at a significant saving.

3. ARMCO ALUMINIZED STEEL Type 1 means greatly increased service life—for mufflers and other consumer, commercial and industrial products menaced by heat and corrosion. Furnace, heater and appliance parts made from this special hot-dip aluminum-coated steel won't discolor to 900 F, won't scale under 1250 F. Reflective parts bounce back up to 80% of radiant heat, remain strong.

New steels are born at Armco

You Fight Costs and Competition

They combat corrosion, solve heat and painting problems.

4. ARMCO ALUMINIZED STEEL Type 2 offers exceptional resistance to outdoor corrosion. In a mild industrial atmosphere, for example, its hot-dip aluminum coating outlasts the coating on unpainted commercial galvanized steel sheets 4-to-1. It reflects heat, too. The manufacturer of the "vanishing clothesline" casing in the photo cites *savings of 30%* in switching from aluminum to Armco ALUMINIZED STEEL Type 2. The reason: ALUMINIZED STEEL permitted reduction in metal thickness without loss of strength. It also assured greater resistance to damage. Ideal for construction products exposed to the weather.

5. ARMCO COLD-ROLLED PAINTGRIP and low painting costs go hand-in-hand. Over a mill-applied electrolytic zinc "flash" goes a paint-holding film. You simply fabricate and paint immediately. Sheets resist rusting in storage, take severe fabrication.

Armco Division
Armco Steel Corporation, Dept. B
1901 Curtis Street, Middletown, Ohio

SEND DATA ON

- ☐ New Armco ZINCGRIP A, PAINTGRIP
- ☐ Armco ALUMINIZED STEEL Type 1
- ☐ Armco Cold-Rolled PAINTGRIP
- ☐ Paint Savings with Armco ZINCGRIP
- ☐ Armco ALUMINIZED STEEL Type 2

Name _____

Title _____

Firm _____

Street _____

City _____ Zone _____ State _____

ARMCO Armco Division

THIS IS SHOT ● AND THIS IS GRIT.
WE MAKE BOTH IRON AND STEEL*.
QUALITY IS CONTROLLED OF COURSE.
WE THINK THEY'RE THE MOST "PERSUASIVE ABRASIVES" MONEY CAN BUY.
OUR CUSTOMERS DO, TOO.

*Made in our modern electric furnaces.

CLEVELAND is the name and the place for PERSUASIVE ABRASIVES

CLEVELAND METAL ABRASIVE COMPANY
World's Largest Production Capacity
GENERAL OFFICE: 888 East 67th Street • Cleveland 3, Ohio
PLANTS: AT Howell, Michigan; Toledo; Cleveland • Teletype: CV 901

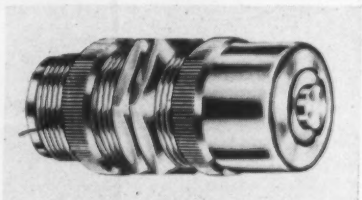
3560-CMA

measures dc current and transmits these measurements pneumatically to a central receiver. The principle of operation is inferential. The unit senses the magnetic field established by dc current flowing through a bus-bar conductor. Magnetic lines of force, surrounding the conductor, deflect a pivoted, rod-shaped magnet in the transmitter. The torque associated with this deflection is directly related to the intensity of the magnetic field, and hence to current flow. This torque operates a flapper-nozzle in the pneumatic force-balance system. Then the 3-15 psi pneumatic output is transmitted to a remote receiver. Several advantages are apparent in the system. In the first place, there's no contact of any kind between the transmitter and the current-carrying member. Also, the system maintains accuracy to ±0.5 pct of the maximum-current value. (The Foxboro Co.)

For more data circle No. 31 on postcard, p. 247

Detects Vibrations

Without contacting the object which is being tested, a dual-purpose transducer can either detect or



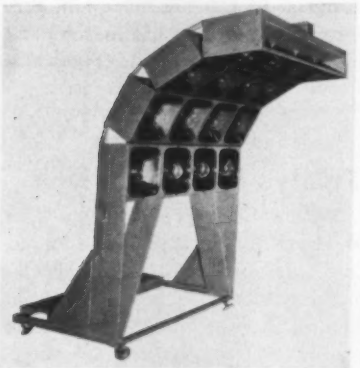
excite vibrations. The newcomer also permits investigation of pulsating phenomena. The object which is being measured or vibrated doesn't need to be magnetically conductive. By affixing a thin disk of silicon steel to the object, it's rendered effective for study by the pickup. (The Korfund Co., Inc.)

For more data circle No. 32 on postcard, p. 247

Portable Heat Panels

These electric, infrared, portable heat panels can be formed into any size of paint-baking or curing-oven design. They're available in

four different reflector wattages from 125-500 w. Units are mounted in dieformed steel banks of 4-, 6-



and 8-ft lengths. A toggle switch controls each reflector bank. (Radcor, Inc.)

For more data circle No. 33 on postcard, p. 247

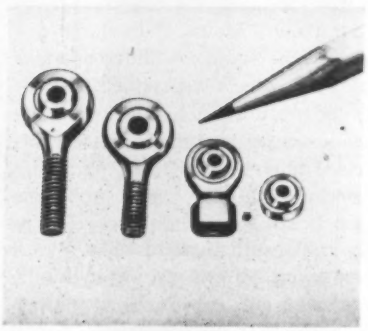
Oxide-Removing Dip

To improve electroplating on to copper and copper-alloy printed circuits, a new formulation removes oxides, light soils, and similar plating deterrents through a simple dipping operation. It cleans without affecting plating resists, or etching copper circuits. This promotes reject-free production in subsequent electroplating operations. Packaged in a polyethylene container, it runs easily to mix with equal parts of water in a processing vessel. (The Meaker Co.)

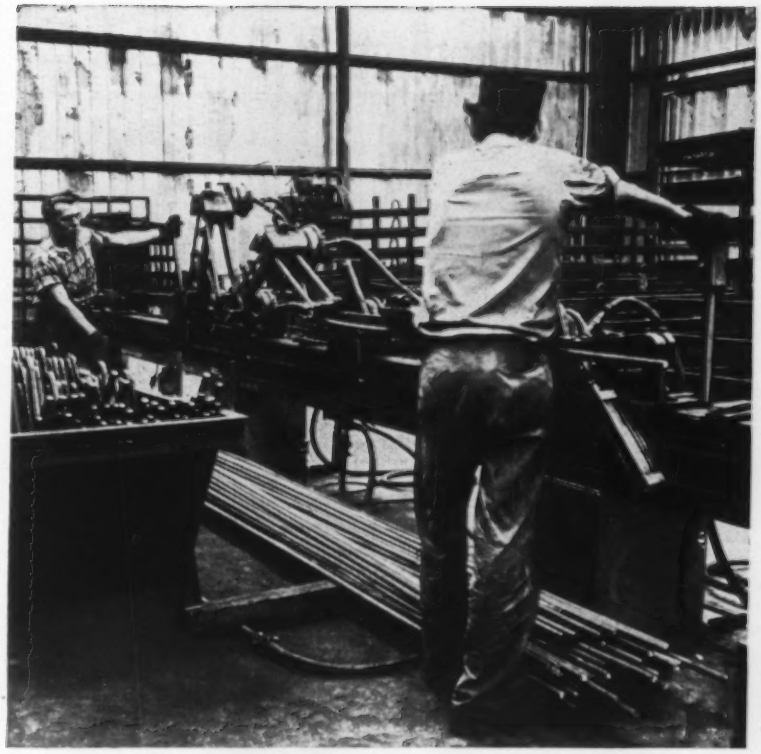
For more data circle No. 34 on postcard, p. 247

Two-Piece Bearings

Volume production of these precision, two-piece, plain- and rod-end bearings is now underway. The



miniature, self-aligning units are available in bore sizes from 0.046-0.156 in., with ultimate static-load



"WE BEND BAR JOIST WEBS THREE TIMES AS FAST"

Arthur S. Guille, Pres., Guille Steel Products Company, Norfolk, Va., says, "Prior to our purchase of a Zig-Zag® Web Bender, all webs were bent by hand, one bend at a time on a horizontal plane. It was necessary to move bar stock forward and flip it for each successive bend. The resulting web often lacked evenness in panel point spacing, causing delays on the welding assembly line.

"The Zig-Zag Web Bender bends webs three times faster than our previous method with no increase in personnel. Webs are completely bent in 45 secs. to 2½ minutes, depending on the size of the web. In addition, we get much greater accuracy in depth, pitch and radius of our bends 8" to 24". This means faster, stronger welds."

If you bend bar joist webs, contact National Bending Machinery Corp. today for more information about continuous bending with a Zig-Zag Web Bender.

N B M

National Bending Machinery Corp.

100 STATION STREET • JOHNSTOWN, PA.

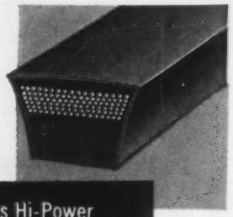
Need replacement V-Belts?

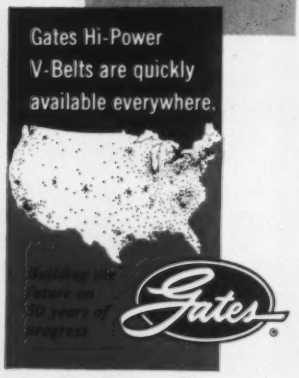
Reliability of Gates Hi-Power V-Belts makes them industry's No. 1 choice

The exclusive construction features of Gates Hi-Power V-Belts—the Concave Sides (U.S. Patent No. 1813698), the Archêd Top, the Flex-Bonded Tensile Member—make them more dependable than ordinary, conventional V-belts. They give you long belt life on even the toughest applications.

Moreover, because of Gates high standards of quality control, you get a perfectly matched set of Hi-Power V-Belts every time—every belt pulls its share of the load throughout the service life of the drive, further increasing belt life.

You will get fast delivery of Hi-Power V-Belts from the local stock of your nearby Gates Distributor. Call him today.





The Gates Rubber Company
Denver, Colorado
BP 60

Gates Hi-Power V-Belts

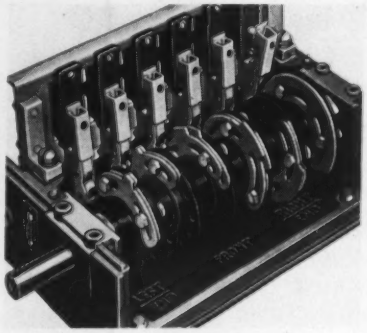
DESIGN DIGEST

ratings from 225-2550 lb. They're designed to provide maximum performance and long life in compact, lightweight assemblies. (Southwest Products Co.)

For more data circle No. 35 on postcard, p. 247

Twelve-in-One Switch

A new line of rotating-cam limit switches features sealed, lifetime, lubricated ball bearings and diecast bearing blocks. The shaft of this control device may be connected to a rotating element by direct coupling. Or, it may be driven by a gear train or roller chain. Each adujstable cam operates a separate switch which controls the travel of a machine member, or initiates



operations for any length of angular travel from 18-360°. (Clark Controller Co.)

For more data circle No. 36 on postcard, p. 247

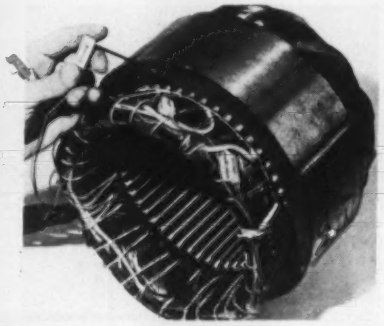
Rugged Gear Pump

Available in three series, a new extra-heavy-duty pump line delivers from 7-97 gpm at 1800 rpm. Complete redesign of the gear-tooth contour results in more discharge per in. of gear width. Another key feature is a specially-designed, crown-roller bearing. Increased load-bearing capacity maintains perfect internal alignment and ups pump-life expectancy. Also, tests prove the new bearings are less susceptible to internal contamination. The pumps are suited for such uses as hydraulic operation of construction, mining, materials-handling, agricultural and ground-support equipment. (Commercial Shearing & Stamping Co.)

For more data circle No. 37 on postcard, p. 247

Cuts Out Hot Motors

An inherent protector may be installed in the end windings or stator slots of electric motors to provide built-in protection against over-



heating. The protector can be applied in integral-horsepower motors through 200 hp with ratings of 600-v as the maximum. (General Electric Co.)

For more data circle No. 38 on postcard, p. 247

Low-Pressure Filter

Low-pressure filter assemblies fill a broad variety of fluid-system applications. Here's a new line of these items rated for 150 psi at 100°F. Typical uses include hydraulic-power systems, industrial air-line networks, diesel-fuel systems, pneumatic-power supplies

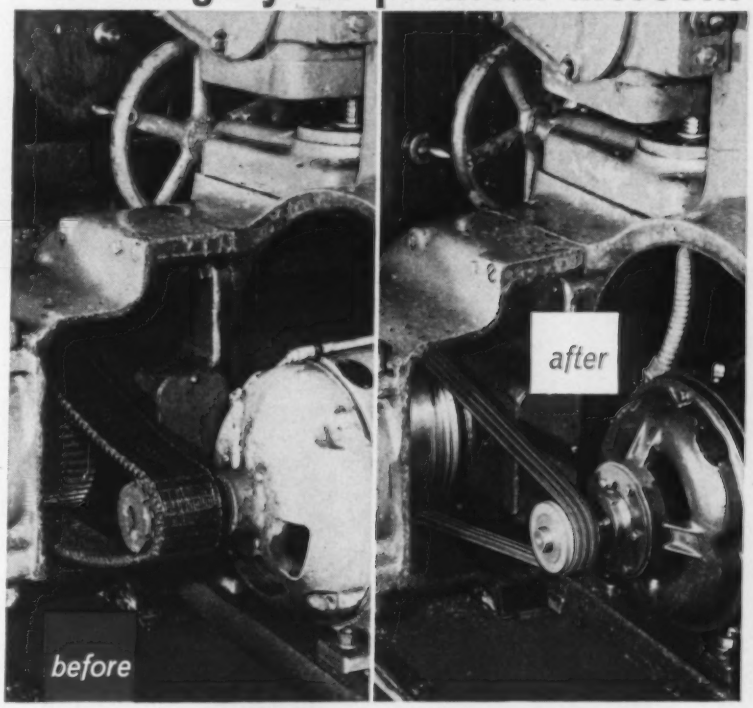
and lubricating-oil systems. (Bendix Filter Div., The Bendix Corp.)

For more data circle No. 39 on postcard, p. 247

Trepanning Tools

A new line of standard-trepanning tools is now available to metalworkers. All tool diameters from 2 in. up will produce holes from the solid in one pass. These trepanners can be used on turret lathes, boring mills, drill presses, gun lathes or special-turning machines. Bits will be stocked in high-speed

Redesign your problem drives...



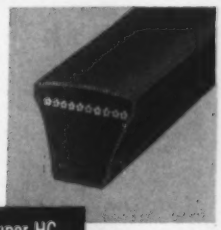
How Gates Super HC Drives are reducing drive down-time

If you have a chain, gear, flat belt or conventional V-belt drive that is causing costly production down-time or high maintenance costs, a Gates Super HC High Capacity V-Belt Drive can be your answer.

Because of exclusive changes in V-belt shape, construction and materials, a Gates Super HC Drive can handle the same power as a conventional V-belt drive in ⅔ to ½ the space—with fewer belts and smaller, lighter-weight sheaves. As a result, bearing loads are less, giving increased bearing life. Also, it is often possible to eliminate outboard bearings and jack shafts, reducing the number of elements present to cause drive down-time.

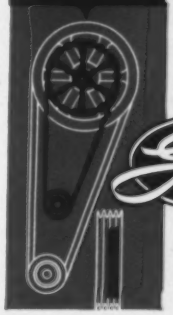
Moreover, Gates Super HC Drives absorb machine-damaging vibration and shock. Multiple belts assure you of continuous operation, further cutting costly machine down-time.

The Gates Man near you is a drive design expert. Ask your nearby Gates Distributor for his help when you have a drive problem.



Gates Super HC Drive saves space, weight and money

Exclusive design features include: precisely engineered Arched Top, Concave Sidewalls, Flex-Weave cover, super strength tensile construction.



Gates

Building the future on 50 years of progress

The Gates Rubber Company
Denver, Colorado
BF61

Gates Super HC V-Belt Drives

steel, carbide and Tantung. (Schmidt & Sefton, Inc.)

For more data circle No. 40 on postcard, p. 247

Patches Most Materials

Resistant to most acids and alkalies, a two-part patching compound consists of a metal-filled resin and a hardener. Repairing dents in sheet metal, defects in metal castings; caulking metal seams in ducts and tanks; sealing automobile radiators and plumbing fixtures; these are just a few of the many uses visualized for the new compound. It sets in 2-4 hours at room temperatures and it cures overnight. Shrinkage is practically nil when the compound's used as a filler or sealer. Shelf life is rated as indefinite. (The Borden Chemical Co.)

For more data circle No. 41 on postcard, p. 247

THOUSAND

CHOICES OF WASHERS

FOR INDUSTRY'S EVERY NEED

Today's complex design, purchasing and production problems in the Metalworking Industry require that *every* component be up to standard.

Considering the millions of washers used each year in the average plant, can you afford to specify and buy anything but the best? *Milwaukee Wrot Washers* is a brand name you can trust... products of the world's largest producer, *Wrought Washer* of Milwaukee.

Over 129,000 sets of washer dies are at your disposal, to produce huge quantities or small special orders of ferrous, non-ferrous, stainless steel, plastic and fibre washers — with prompt deliveries and moderate prices your buying/specifying team will appreciate! May we quote on your next order?

WW/5/6061/MP

PURCHASING PERSONNEL . . . Free samples available. Request on your letterhead, mentioning types of washers your company uses most frequently. Or write for Washers and Stampings Catalog 40-B.

MILWAUKEE WROT WASHERS

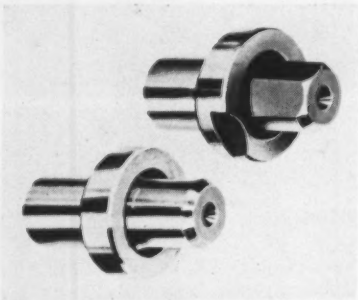
WROUGHT WASHER MFG. CO.

2110 SOUTH BAY STREET, MILWAUKEE 7, WIS.
SHeridan 4-0771 • twx MI 277

WORLD'S LARGEST PRODUCER OF WASHERS

Locating Pins

Available in both diamond and round styles, a new line of locating pins incorporate a resting-shoulder feature. This feature permits the pins to serve as rest pads. Both the diamond and the round styles are carburized. They're hardened to 60-62 Rc to provide tough wearing surfaces with mild cores. A total of

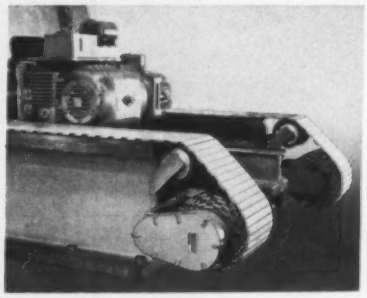


368 sizes, ranging from ⅛-1½ in. head diameters, probably constitutes the largest range of sizes offered in the metalworking industry. (Jergens Tool Specialty Co.)

For more data circle No. 42 on postcard, p. 247

Motorized Curtains

Totally-enclosed spring take-up motors with constant-torque recoil eliminate the need for cone and cable assemblies in winding up way curtains. The rigid extruded-aluminum curtains are strong enough for



operators to walk on. No maintenance is required and all parts are easily replaced. (Futurmill, Inc.)

For more data circle No. 43 on postcard, p. 247

Boosts Pressures

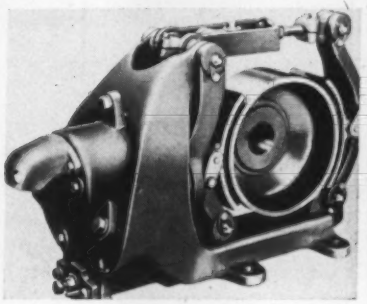
Quite often, it's necessary to boost the shop-line pressure up to two and three times the normal pressure. This can be done by applying a new booster pump to any

location in the shop line. Thus, you get the desired pressure at the point of operation. Or, suppose there's a drop in the shop air-line pressure. Introduce one of these units to insure ample pressure at the point of operation. The self-contained booster pumps produce a maximum output pressure of 300 psi, on an air line of 80 psi. All necessary fittings, line filters, lubricators and gages are included in the one power package. (Dayton Rogers Mfg. Co.)

For more data circle No. 44 on postcard, p. 247

Magnetic Motor Brake

An 8-in., dc-magnetic, shoe-type brake is being offered to handle 600 series mill motors. The brake's design assures that equal pressure is applied against the wheel by



both sides. These wheels are self-aligning and symmetrical. Shoes fit both sides with either end up. Magnet coils can be changed on the job without dismantling the brake. (Clark Controller Co.)

For more data circle No. 45 on postcard, p. 247

Cuts Core Bake Time

A new type of core-oil additive reduces bake time by as much as 60 pct. Designed for use in making cores for steel, iron, and nonferrous casting production, the oil helps increase tensile strength to 250-400 psi. (G. E. Smith, Inc.)

For more data circle No. 46 on postcard, p. 247

Teflon-Lined Hose

Teflon-lined hose can carry the chemicals right to the job. The metal over-braiding on this new hosing provides outstanding resistance to flexing, pressure and vibration fa-

BY THE TIME YOU FINISH YOUR SMOKE

Step into any plant equipped with a Danly Quick Die Change Press —and watch! You'll see the Q.D.C. change dies in less time than a cigarette takes. As one self-propelled bolster assembly rolls the old die out of the press, another one rolls the new die in. And the press goes right back into production on a new part. Think of the hours of profitable production you'll gain with this time-saving Danly development. Think of the efficiency you'll get on short-run production. And while you're thinking about it, decide right now to find out more about the Danly Q.D.C. Press.

DANLY®

BULLETIN Q.D.C.-1 Tells how the Danly Quick Die Change Press can drastically reduce your die change downtime. Write for your copy.

Mechanical Presses, Die Sets, Diemakers' Supplies, Hydraulic Metalworking Equipment

DANLY

DANLY MACHINE SPECIALTIES, INC., 2100 South Laramie Ave., Chicago 50, Ill.

"PASSING THE BATON"— FROM WHITING TO WHITING

The big Whiting Distributing Ladle has been storing the melt. Slag, rising to the top, has hardened to form a natural lid and retain the heat below. Now the "baton"—a stream of slag-free metal—is passed through the outside teapot spout into a Whiting Pouring Ladle with bottom tap for final relay to the molds.

This scene is typical of efficient foundry operations throughout the world. Whiting engineers, practical foundrymen themselves, have designed more than 200 types and models of metallurgical ladles to reduce costs, speed output and improve casting quality in every pouring operation. If you have a special need, they'll design a special ladle to meet it precisely. And there is no charge for this service. See your local Whiting rep or write direct.

FREE: Bulletin FY-163-R, *WHITING LADLES.* Forty pages of illustrated ladle models and accessories to cut your casting costs. Write for it today. *Whiting Corporation, 15601 Lathrop Avenue, Harvey, Illinois. In Canada: Whiting Corporation (Canada) Ltd., 350 Alexander Street, Welland, Ontario, Canada.*

90 OF AMERICA'S "FIRST HUNDRED" CORPORATIONS ARE WHITING CUSTOMERS

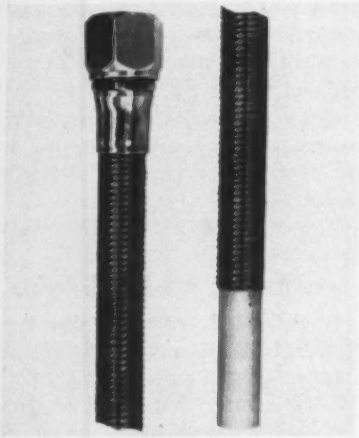
WHITING

MANUFACTURERS OF CRANES; TRAMBEAM® HANDLING SYSTEMS; PRESSUREGRIP; TRACKMOBILES®; FOUNDRY, RAILROAD, AND SWENSON CHEMICAL EQUIPMENT

FOUNDRY EQUIPMENT

DESIGN DIGEST

tigue. The Teflon inner core will withstand temperatures from –65 to 500°F. Its dielectric power factor

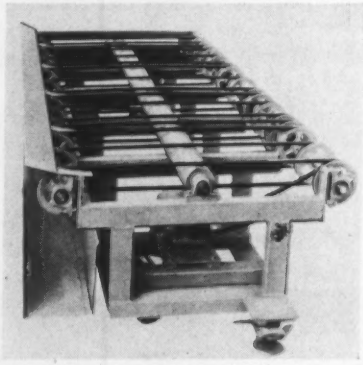


is extremely low. (Timely Technical Products, Inc.)

For more data circle No. 47 on postcard, p. 247

Sheet Stacker

An all-electric sheet stacker conveys sheared material to skids or into a scrap bin. The unit's overall depth is less than 4 ft. It's easily moved since it's light in weight and equipped with ball-bearing casters. The stackers are supplied in sizes to fit 4-, 6-, 8-, 10-



and 12-ft shears. They handle up to ⅛-in. steel or ¾-in. aluminum. (American Actuator Corp.)

For more data circle No. 48 on postcard, p. 247

Pump Cuts Wear Costs

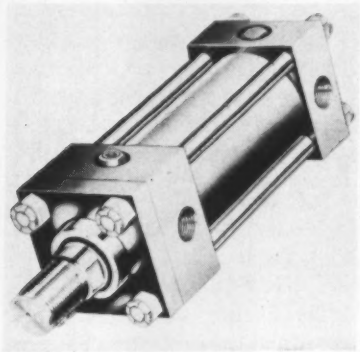
An imporant benefit that is standard on a line of heavy-duty end-section centrifugal pumps is axial adjustment of the semi-open

impeller. With this feature, you can regulate capacity and head and adjust for impeller wear. This can be done while the pump is running. The shaft-adjustment nut prevents any forward axial movement of the impeller. No new part is needed for the adjustment and it immediately improves performance. This feature results in reduced replacement and maintenance costs. (The Deming Co.)

For more data circle No. 49 on postcard, p. 247

Hydraulic Cylinders

Bushings of high-grade bronze and special wear rings assure long trouble-free life to a new line of air and hydraulic cylinders. A rod wiper, incorporated at the front of the cylinder, removes grit and other



foreign matter with every piston stroke. This arrangement eliminates the possibility of piston scoring and seizure. The unit comes in a wide range of sizes and capabilities for ladle, shakeout, conveyor, shell-casting and other foundry operations. (Milwaukee Cylinder Co.)

For more data circle No. 50 on postcard, p. 247

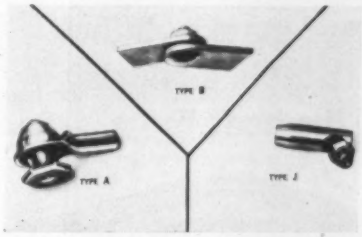
Solid, Grooved Pins

Solid, grooved pins can replace hollow pins for fastening electronic-connector, screw-lock assemblies. In addition to holding the assembly intact, the pins also serve as hand grips for tightening or loosening the screw locks which engage and disengage the connectors. You don't need to hold tight tolerances on the mating part to keep the pins tight. The grooved-pin principle in itself creates the tight fit. When the pin is forced into the drilled hole, the constraining action of the hole wall compresses the pin. This produces a locking fit. (Groov-Pin Corp.)

For more data circle No. 51 on postcard, p. 247

Ball Joints and Pivots

Here is a new line of linkage ball joints and pivots to meet every need. The units come in miniature sizes

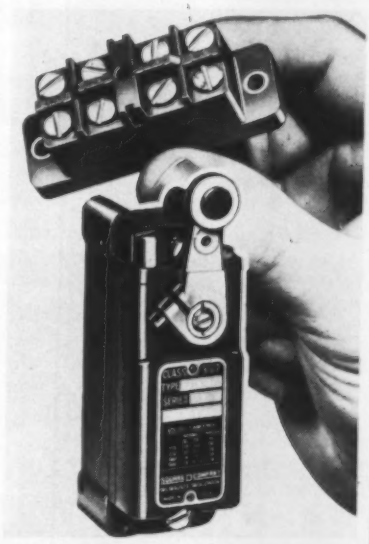


for use on typewriter linkages, on up to giant sizes suitable for heavy machinery, automobile steering joints and ball suspensions. Basic features of the joints and pivots, which accounts for their high strength, is construction with a hollow stud and a ring bearing. This results in much lower stresses at critical points. It also endows the unit with a high-load capacity. (Link-Age Corp.)

For more data circle No. 52 on postcard, p. 247

Oil-Tight Switch

Oil-tight limit switches are available with a two pole throw. These



new units control up to four circuits. They're available with a wide

Capacability means

Savings

When it comes to gun refractories, *saving* is Basic. You can "sock away" time and money with Basic's BRI GUN and gun refractories such as GUNDOL and GUNMIX . . . keys to easier, faster, less costly furnace maintenance.

Electric furnace operators report that GUNDOL, GUNMIX and GUNMAG for routine maintenance of sidewalls doubles lining life and, in many cases, cuts refractory costs in half. Shooting open hearth frontwalls, backwalls and skewbacks with GUNCHROME-M produces similar savings.

If you use basic refractories, you can depend on Basic's *capacity* and *ability*. Write for 24-page booklet outlining application of Basic's more than thirty dead-burned dolomites, ramming and gunning refractories, patching materials and tar-bonded linings for basic oxygen furnaces.

BASIC INCORPORATED

845 HANNA BUILDING
CLEVELAND 15, OHIO

METALLURGIST REPORTS:

Soffel's

EXOTHERMIC SIDEBOARDS

"produce sound fully killed steel . . . in line with ladle analysis of the heat."

". . . ultrasonic tests show complete ingot soundness . . . macro-etch tests show good quality . . . chemical analysis of the ingots are in line with ladle analysis of the heats."

A trial run in your plant will prove beyond question, you'll get sound steel and MORE OF IT with Soffel's Exothermic Sideboards.

Phone NAtional 5-1571

PRODUCT ADVANTAGES

- **Eliminate permanent and conventional hot tops.**
- **Easy, and single, stripping of Big End Down molds.**
- **Sideboards are easily placed in head of mold by one man — crane only necessary on very large ingots.**
- **Longer mold life — less mold cost — less mold inventory to carry.**

Soffel's Exothermic Sideboards increase ingot yield, assure top cut soundness and provide more ton steel out the door per ton of steel in the ingot.

Pittsburgh Metals Purifying Co.

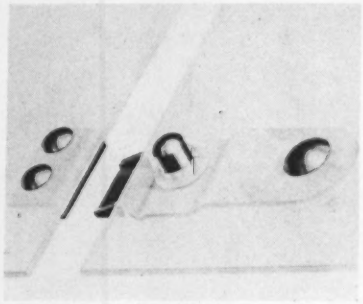
MARS, PENNSYLVANIA

selection of operators including push rods, roller plungers and roller arms in a variety of lengths and sizes. (Square D Co.)

For more data circle No. 53 on postcard, p. 247

Pushbotton Catch

Push the button and off pops the cover. At least that's the action you get when this new, quick-release holddown is mounted to the inside of a cabinet by rivets. It can also be welded. There's nothing visible on the outside of the closure but a small pushbutton. Measuring only ¾ in. in width and 2½ in. in length, these quick-release holddowns are available with either a



90° or a 180° keeper mounting. Keeper and release buttons are cadmium-plated steel (Southco Div., South Chester Corp.)

For more data circle No. 54 on postcard, p. 247

Cushions Shock

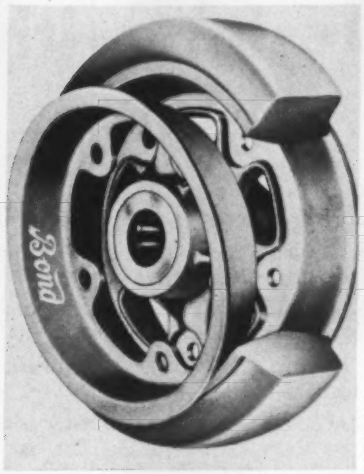
Available for immediate delivery, new elastothermic shock mounts have a guaranteed plus or minus 10-pct spring rate. They are dimensionally designed to simplify mounting designs and tooling. The units provide semi-standardization in the selection of auxiliary mounting hardware, such as base legs, suspension legs or frames. Mounts are bolted; no studs required. Cure dates are shown on the elastomer. (Lyon Aircraft Services)

For more data circle No. 55 on postcard, p. 247

Long-Wearing Wheels

Bonduthane, polyurethane castor wheels are now available in both

demountable and vulcanized-on types. These new units are said to provide longer service life as well

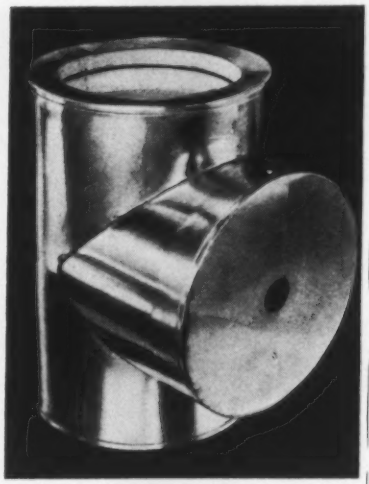


as improved floor protection. Good load-carrying capacity, abrasion and compression resistance, and frictionless easy-rolling characteristics are additional bonus features. The demountable wheels come in 6- and 8-in. diameters. Vulcanized-on units are available in diameters ranging from 4-10 in. (Bond Foundry & Machine Co.)

For more data circle No. 56 on postcard, p. 247

Gate-Valve Covers

Shipped ready to install with polyurethane, calcium silicate, foam-glass or cork insulation, pre-



formed aluminum-gate-valve covers are designed for easy removal to facilitate replacement of packing in the valves. A watertight seal is effected by an overlap with the ad-

This worker at the Coatesville, Pa. plant of Lukens Steel Company is using a Pannier Marker equipped with the newly-designed magazine-style marking head to stamp hot slabs with an identifying number.

Hot Steel Marking by controlled impact

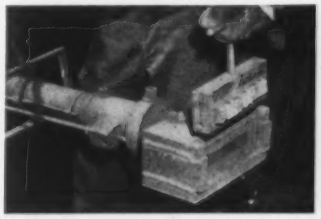
Uniformly clear stamping of heat or ingot numbers on billets or slabs, or serial or part numbers on hot forgings is provided by Pannier Single Stroke Pneumatic Markers.

The operation is positive, fast and automatic. The worker, standing comfortably back from the heat, is able to position the marking head accurately against the steel. The hammer first aligns itself, trips itself and makes the impact automatically.

The new head shown here incorporates a fast-change typeholder that permits users to change entire type set-ups quickly, easily and safely. Pre-set type is now economically possible. In just a few seconds, a spare type magazine with an all-new type set-up can be inserted into the marking head. Pre-setting type prevents costly down-time for changes.

The type magazine is made to accommodate lines of interchangeable characters positioned to your specifications. The type is held secure in the magazine by Pannier's sure-safe locks...spilling danger is eliminated.

Pannier engineers will be glad to consult with you on hot steel marking. For complete information, write



This fast-change stamping head shown in operation above uses a type magazine. By the use of spare magazines for type changes, a new set of numbers can be dropped in place in seconds.

Hardened type is easily released for change in this style Pannier marker head by sliding out the pins. This head is effective where numbers are repeated on several pieces.

Pannier markers are now available for automated operation for larger billets and slabs. This numbering head contains a series of number wheels, rotated and set by push button, tape or card control. The entire marking operation can be completed by programmed remote control.

MASTER PANNIER MARKERS

PANNIER MASTER MARKERS
249 Pannier Building, Pittsburgh 12, Pa.

New Forging Idea News

How to Improve Parts Design with This Fresh Approach to Forging

Design Refinements suggested by COMMERCIAL'S forging experts make many parts in use today better, more economical. Here are detailed examples of only three COMMERCIAL upset forgings which demonstrate how these design refinements have resulted in superior OEM parts at lowered cost.

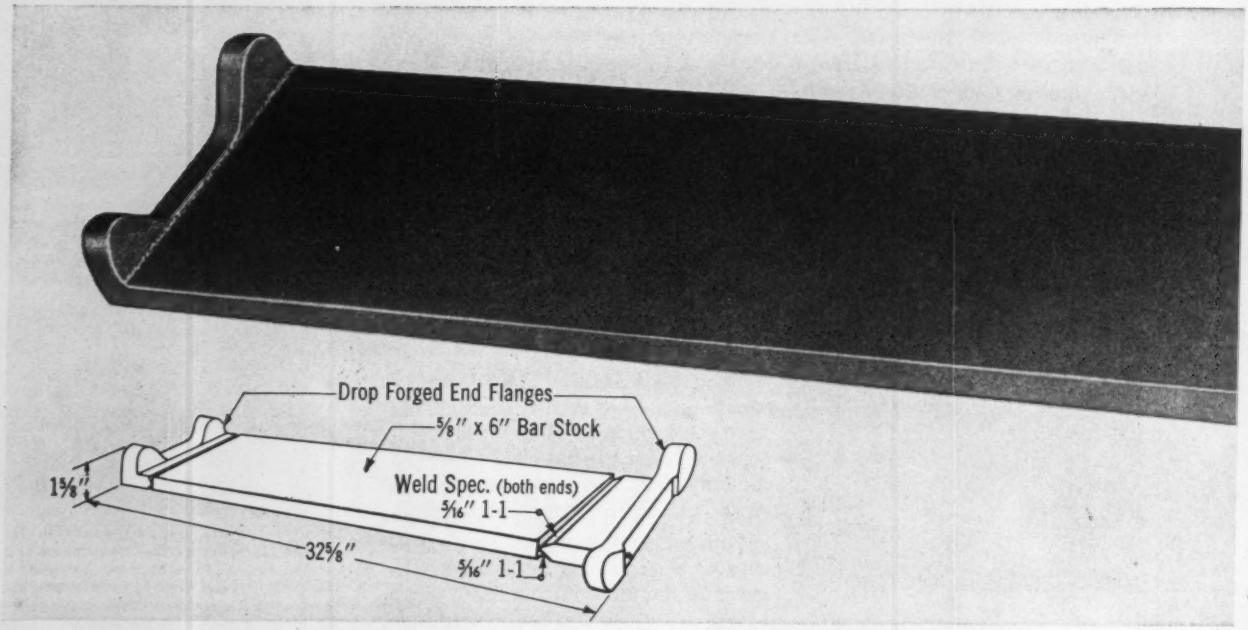
Quality Forgings start with "Forging Quality" rolled steel... closely controlled in its making to eliminate defects, to obtain surface and interior soundness, to refine grain structure into a directed fibrous flow. Upset Forgings in closed dies produces by squeeze pressure a "looped" grain flow and permits concentration of grain density at points where the service stresses are calculated to be the greatest. Also, control of the directioning of the inherent fiber-like structure provides for maximum strength of the metal at required stress points. Not only are the properties of the metal improved in all directions, but also the metal structure is refined and compressed resulting in a structural uniformity that renders the metal remarkably free from concealed defects. Result: Tough, strong part—free of hidden defects and surface flaws.

Advantages of Upset Forgings

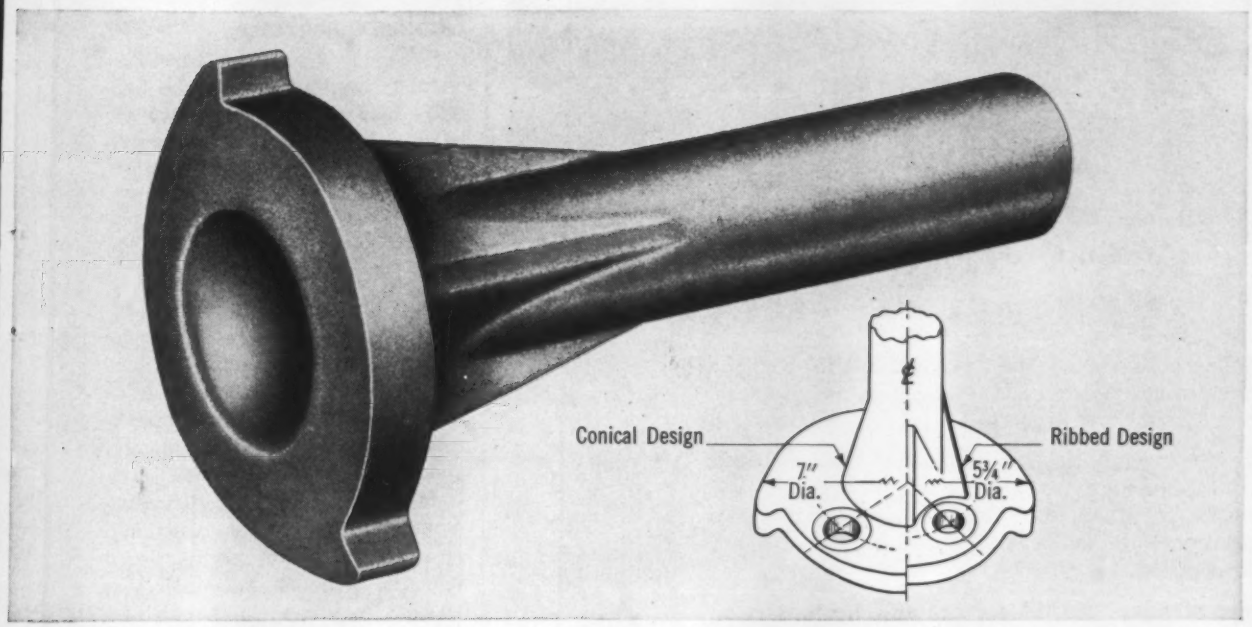
- *Uniform strength, toughness and high fatigue resistance insure longer, more dependable service life for equipment.*
- *Parts made closer to finished dimensions—cuts scrap, reduces machining and finishing time.*
- *Components can be assembled by simple production methods into complex parts.*
- *Uniform response to heat treatment gives desired physical properties of precise degree.*
- *Higher strength-to-weight ratio obtainable—a vital factor in the design complexity of parts for the future.*

Features of Upset Forging by COMMERCIAL

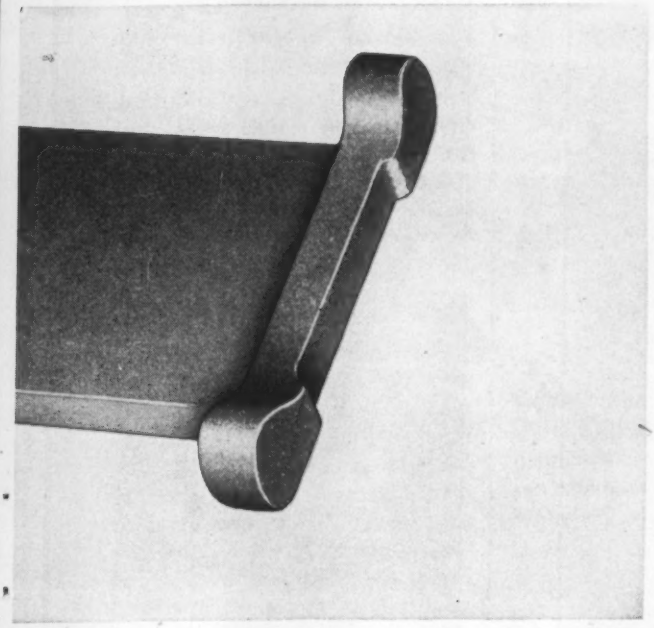
- *Batteries of upsetters from 1½" to 8"—custom or production runs.*
- *Hydra-Jet descaling prior to forging reduces imbedded surface scale.*
- *Magnetic particle depth inspection to detect metal faults before shipment.*
- *"Task Forging" team steeped with experience in producing the unusual upset forging.*



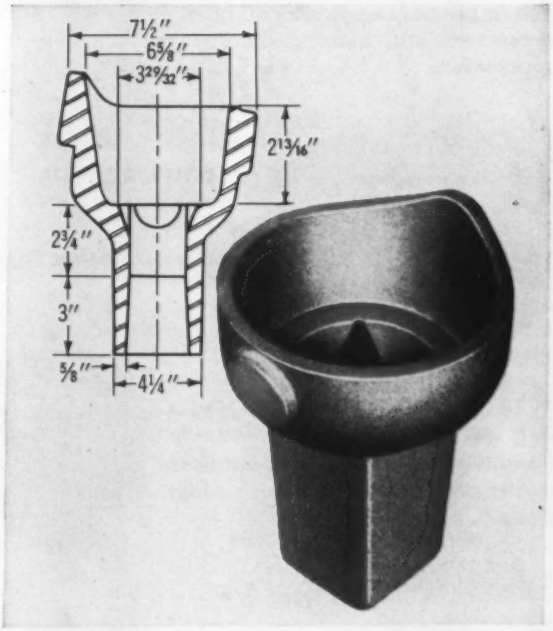
FORGING REPLACES WELDMENT—Structural side bar for agricultural tractor was formerly fabricated from ⅝" x 6" mill-edge bar stock and two drop forged end flanges. COMMERCIAL'S redesign called for a homogeneous "metal quality" upset forging. Controlled, fiber-like grain structure is concentrated at stress points. All welding and grinding is eliminated. Warpage disappeared and surfaces are smooth ready for final high lustre finish. Except for automated drilling of holes, now possible due to close tolerance forging, the part is ready for assembly line. Customer benefits have decisively proved the advantages of COMMERCIAL'S "Task Forging" team know-how.



FRESH APPROACH DESIGN SAVES 25%—Lower front end steel tractor spindle, if produced to conventional design, presented excessive weight problem. Symmetrical conical taper from shank to cam head called for 45 lbs. blank weight. COMMERCIAL produced the part to the ribbed taper design with 34 lbs. blank weight. Here is an excellent example where closed die forging most efficiently positions quality metal. Even the cam ears were upset to exact size and location. Result: Smaller part with ample strength, important cost benefits.



While designs are on the board, call on COMMERCIAL'S "Task Forging" team to collaborate with you. Many other ingenious solutions by COMMERCIAL to tough forging problems are detailed in Bulletin 600-P1. Write Commercial Shearing & Stamping Company, Dept. K-37 , Youngstown 1, Ohio.



UNIQUE FORGING SUPPLANTS CASTING—Unusually shaped axle trunnion socket seemingly was a natural for casting because of a symmetrical trunnion end plus external boss. COMMERCIAL produced the part to finished size via closed dies in an 8" upsetter. Metal had to be displaced both internally and externally. Result: Rejects cut way down, less machining, stronger part, weight reduced, metal saved.

When it's a vital part, design it to be FORGED

COMMERCIAL
shearing & stamping

The <IMPERIAL> Line

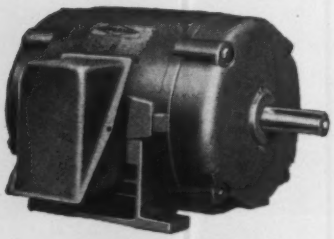
MOTORS • GENERATORS • MOTOR-GENERATOR SETS

BEST POWER FOR STANDARD AND SPECIFIC-PURPOSE APPLICATIONS

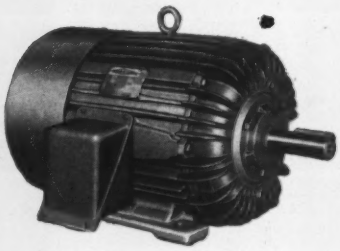
Modern as the missile age . . . Imperial electric motors are created with a background of more than 70 years of industrial drive experience.

Now, through the use of electronic computers, multiple-design review is made possible in advance of production. Optimum performance is assured while delivery of special-purpose designs is speeded.

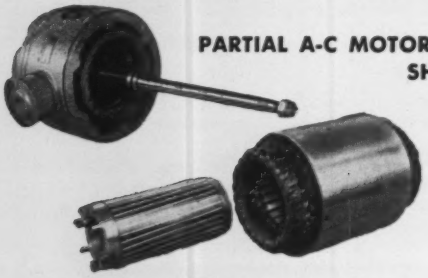
For standard NEMA motors and for motors to meet unusual drive requirements, you will do better with Imperial. Write for bulletin covering *The Imperial Line* of integral horsepower motors, generators and motor-generator sets for every application.



DRIP-PROOF A-C MOTOR—*Today's Best Buy for Most Applications—Ratings from 1 to 200 Hp.—Designs Include Flange and Face Types, Multi-Speed, etc.*



TOTALLY-ENCLOSED, FAN-COOLED A-C MOTOR *Provides Dependable Operation Under Abnormal Conditions — Also Available in Explosion-Proof Design—1 to 100 Hp.*



PARTIAL A-C MOTOR . . . SHELL-TYPE SHAFTLESS MOTOR *. . . Other Special or Specific Types . . . Provide Maximum Power in Minimum Space . . . Blend with Basic Design of Machines.*

<IMPERIAL> ELECTRIC COMPANY

84 Ira Avenue • Akron 9, Ohio

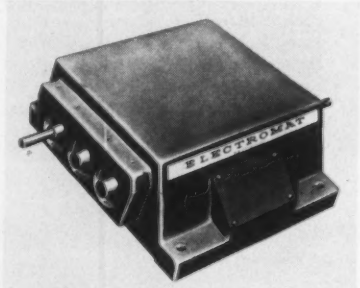
DESIGN DIGEST

jacent pipe covering. Then the cover is held in place with screws, bands or pop rivets. (Premetco)

For more data circle No. 57 on postcard, p. 247

Gear Transmission

Two electric clutches and an electric brake team up in a precision gear transmission to provide rapid traverse rates, low positioning speeds and consistently-accurate stopping. This geared transmission also maintains remotely-controlled speed selections, constant-torque control and a braking action that can be integrated into any machine-control scheme. Speed selection is obtained through gear changes by means of the high-response electric clutches. These clutches operate in oil to insure



trouble-free life and optimum heat dissipation. The remote torque control yields smooth accelerations and shock-free stops. (Electromatic, Inc.)

For more data circle No. 58 on postcard, p. 247

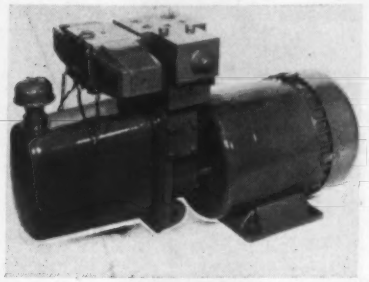
New Asbestos Tape

Asbestos tape with a pressure-sensitive adhesive backing is now available. The new product offers many advantages in industrial applications where asbestos tape is needed for assembly purposes. The adhesive holds the tape in place while parts are positioned or covers applied. The tape suits services up to 500°F in commercial grades. Its use in an unsupported structure is limited, however, to 275°F, the point at which the adhesive begins to lose strength. (Johns Manville)

For more data circle No. 59 on postcard, p. 247

Servo Valves

Newest addition to a complete line of precision industrial servo valves is a single-stage unit. The valve rates at 3 gpm with a 350-psi

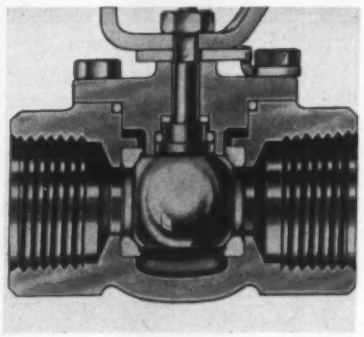


pressure drop. It features simplified design with a torque motor that activates the spool directly. There are only two moving parts. The unit combines high performance (90° phase shift at 200 cps) with ruggedness and reliability. (Vickers Inc., div. of Sperry Rand Corp.)

For more data circle No. 60 on postcard, p. 247

Stainless Ball Valve

One of the most remarkable features of this new ball valve is its precision construction. Teflon seats, for example, are finely molded and then machined, to insure perfect mating between seat and ball surfaces. Basic features include top-entry design, compactness, self-aligning ball, straight-through flow and long-lasting, resilient seats and seals. The unit also features quarter-turn operation, low-operating torque and leak-proof performance. Typical system fluids, for which the new stainless steel ball valve is



designed, include acids, alkalies, petro chemicals, caustics, solvents and semisolids. With Teflon seats, temperature range is from —20°

666. Jomac work glove. Reversible—any two make a pair. Men's knitwrist.

It's GLOVEMANSHIP that makes JOMACS

your best buy in industrial work gloves

GLOVEMANSHIP is an art. It involves combining the ideal yarns, processing the cloth by techniques which will impart the wearing and protective qualities desired, creating patterns, styling cuffs and, finally, producing the finished gloves with real craftsmanship. Jomac practices GLOVEMANSHIP.

What does GLOVEMANSHIP mean to you? It means lower glove costs with quality gloves that afford maximum dexterity, more comfort; that resists oils, greases and stains; that protect hands and forearms against such hazards as cuts, burns, bruises and abrasions; that can be washed time after time.

For better fit, greater dexterity, more comfort, longer wear, and maximum safety in handling most chemicals, oils, greases, etc. — specify North PVC Coated Gloves.

To keep workers dry and comfortable in foul weather and to give them superior protection against chemicals, oils and greases—specify North PVC Protective Clothing.

Write for more information about Jomac industrial work gloves today.

JOMAC Jomac Inc., Dept. K Phila. 38, Pa.

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"Jomac Sells Quality . . . and Quality Sells Jomac!"

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MALLEABLE

For Service Contact...

CONNECTICUT
Connecticut Mall. Castings Co., New Haven 6
Alloy Foundries Division, The Eastern Co., Naugatuck

ILLINOIS
Central Fdry. Div., Gen. Motors, Danville
Chicago Malleable Castings Co., Chicago 43
Moline Iron Works, Moline
Moline Malleable Iron Co., St. Charles
National Castings Co., Cicero 50
Peoria Malleable Castings Co., Peoria 1
Wagner Castings Company, Decatur

INDIANA
Albion Malleable Iron Company, Muncie Division, Muncie
Link-Belt Company, Indianapolis 6
National Castings Co., Indianapolis 22

IOWA
Iowa Malleable Iron Co., Fairfield

MASSACHUSETTS
Belcher Malleable Iron Co., Easton

MICHIGAN
Albion Malleable Iron Co., Albion
Auto Specialties Mfg. Co., Saint Joseph
Cadillac Malleable Iron Co., Cadillac
Central Fdry. Div., Gen. Motors, Saginaw

MINNESOTA
Northern Malleable Iron Co., St. Paul 6

MISSISSIPPI
Mississippi Malleable Iron Co., Meridian

NEW HAMPSHIRE
Laconia Malleable Iron Co., Laconia

NEW YORK
Acme Steel & Mall. Iron Works, Buffalo 7
Frazer & Jones Company Division The Eastern Co., Solvay
Oriskany Malleable Iron Co., Inc., Oriskany
Westmoreland Mall. Iron Co., Westmoreland

OHIO
American Malleable Castings Co., Marion
Central Fdry. Div., Gen. Motors, Defiance
Dayton Mall. Iron Co., Ironton Div., Ironton
Dayton Mall. Iron Co., Ohio Mall. Div., Columbus 16
National Castings Co., Cleveland 6

PENNSYLVANIA
Buck Iron Company, Inc., Philadelphia 22
Erie Malleable Iron Co., Erie
Lancaster Malleable Castings Co., Lancaster
Lehigh Foundries Company, Easton
Meadville Malleable Iron Co., Meadville
Pennsylvania Malleable Iron Corp., Lancaster

TEXAS
Texas Foundries, Inc., Lufkin

WEST VIRGINIA
West Virginia Mall. Iron Co., Point Pleasant

WISCONSIN
Belle City Malleable Iron Co., Racine
Chain Belt Company, Milwaukee 1
Federal Malleable Company, Inc., West Allis 14
Kirsh Foundry Inc., Beaver Dam
Lakeside Malleable Castings Co., Racine
Milwaukee Malleable & Grey Iron Works, Milwaukee 46

These companies are members of the Malleable Castings Council

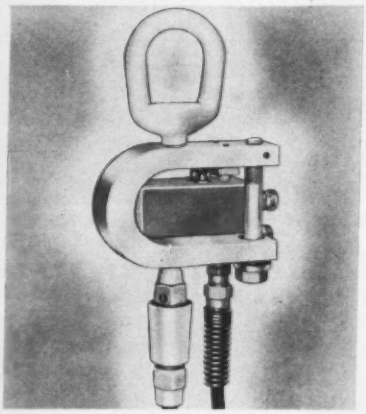
DESIGN DIGEST

to 400°F. The valve is available in ¼-2 in. sizes. (The Lunkenheimer Co.)

For more data circle No. 61 on postcard, p. 247

Overload Switch

Overloading of cranes and hoists is automatically vetoed with this new cable-socket switch. When attempts are made to lift loads be-

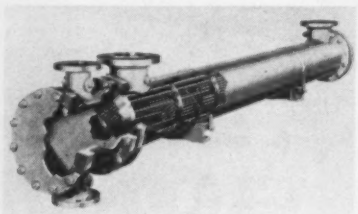


yond preset limits, the switch immediately halts the motor. Red lights and buzzers can also be used as alternatives when only a warning is necessary. (W. C. Dillon & Co., Inc.)

For more data circle No. 62 on postcard, p. 247

Heat Exchangers

Extensive strides have been made in the use of O-ring seals in shell-and-tube heat exchangers. Now, new, removable-tube, bundle-type heat exchangers are rugged, thermally efficient and available with shell diameters from 6-16 in. They're ideal oil or water cooling of internal-combustion engines, com-

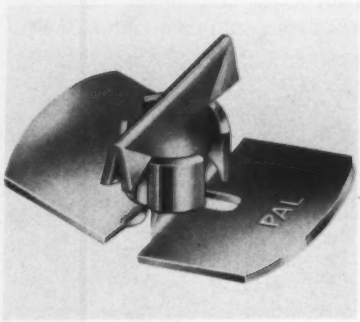


pressors, steam and gas turbines, reduction gears, and bearings. (Basco, Inc.)

For more data circle No. 63 on postcard, p. 247

Blind Fasteners

These one-piece, lightweight, spring-steel fasteners are used for



blind jobs, such as attaching back panels; for securing reflector panels to fluorescent-lighting fixtures, and for other similar light-duty applications. The fasteners feature a barrel shank that keeps them centered in a hole. The shank also adds shear strength. (The Palnut Co.)

For more data circle No. 64 on postcard, p. 247

Small Slide Bearing

A three-section, extruded-aluminum slide provides one of the smallest ball-bearing slides made for

standard or miniature equipment, according to the manufacturer. Rated at a minimum-load capacity of 100 lb per pair, the slide is capable of supporting most electronic equipment. (Grant Pully & Hardware Corp.)

For more data circle No. 65 on postcard, p. 247

Control Resistors

A new series of single-operated, welding-resistor stations for multi-arc welding systems greatly facilitate stacking. The resistor stations permit individual-welder control of current from a multi-arc source in

Now—Finishes Add Beauty to Tough Malleable Castings

Beautiful, protective finishes on tough Malleable iron castings will give your products a superior combination of appearance, ruggedness, and economy. Get complete information on this sales-getting combination from any of the progressive companies that display this symbol —

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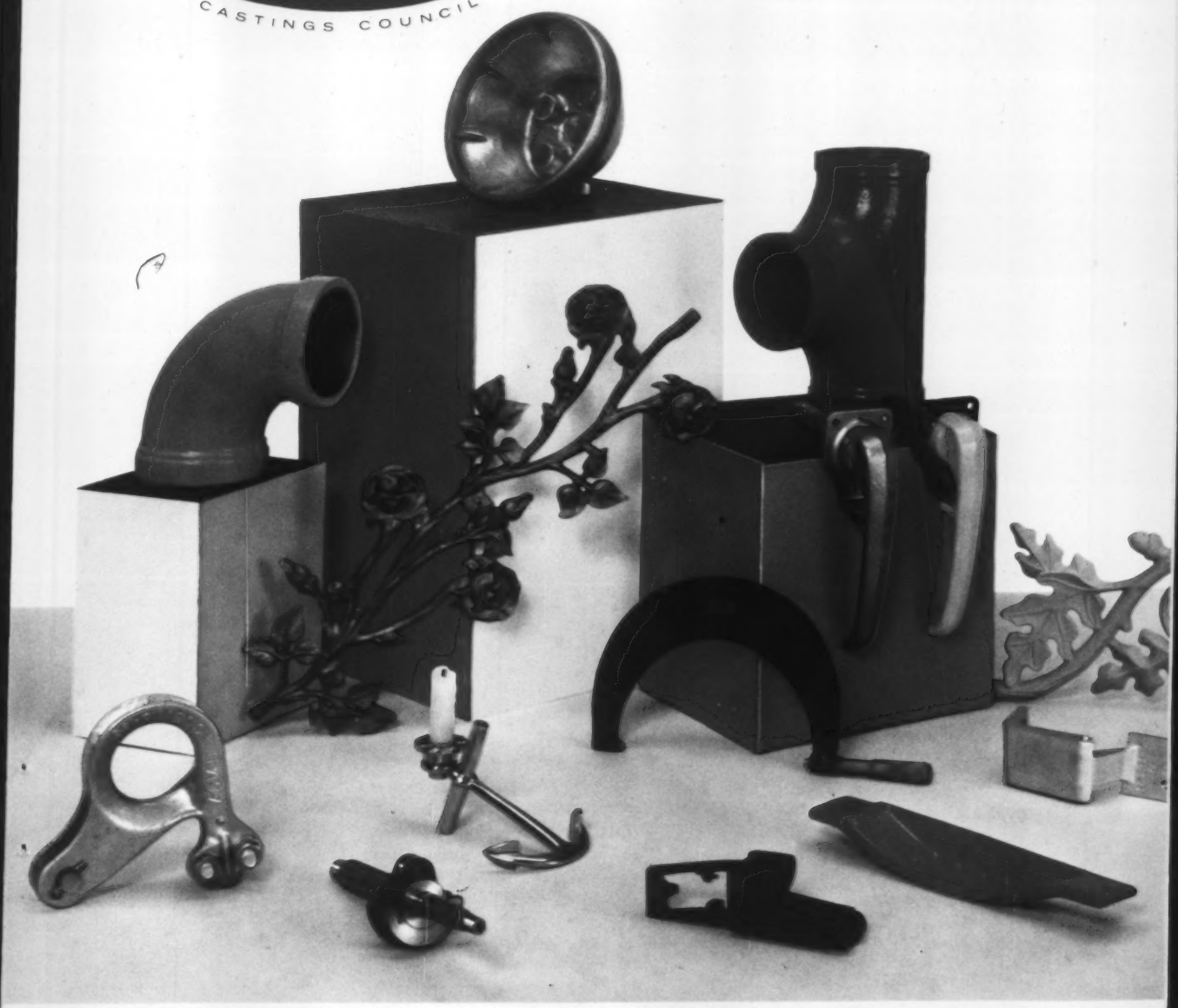
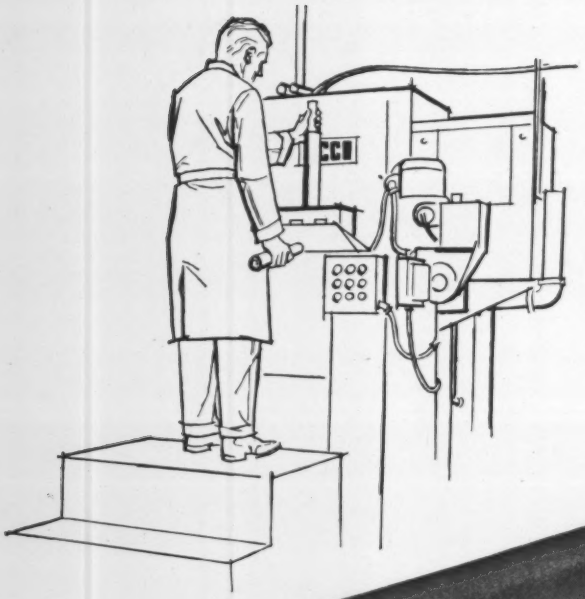
New Ideas for your products are suggested in Data Unit No. 115, available free from any member of the Malleable Castings Council, or write to Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio.



The castings shown have been painted, blued, chromium and cadmium plated, plastic coated, porcelain enameled, galvanized, and machined.



TOCCO Induction Hardening Boosts Track Pin Production 10 Times

The Eimco Corporation of Salt Lake City are producers of heavy-duty earth moving and mining equipment. They recently replaced a low production induction hardening method with a modern, more efficient track pin hardening machine engineered and built by TOCCO for high production operation.

Production Jumped from 208 pins per shift to over 2000 using only one operator. Powered by a 200 KW 3 KC TOCCO motor generator, the new machine produces parts of higher uniform quality with correspondingly better results in service.

Additional Saving is obtained because TOCCO's new continuous roll feed machine does not need center holes in the pins, eliminating two centering operations on each pin.

It will pay you to have a TOCCO sales engineer review your heat treating applications. He can help you boost production and cut costs by the engineered application of induction heating.

JUST PUSH A BUTTON

TOCCO

THE OHIO CRANKSHAFT COMPANY

Mail Coupon Today— NEW FREE Bulletin

The Ohio Crankshaft Co. • Dept. A-9, Cleveland 5, Ohio

Please send copy of "Typical Results of TOCCO Induction Hardening and Heat Treating."

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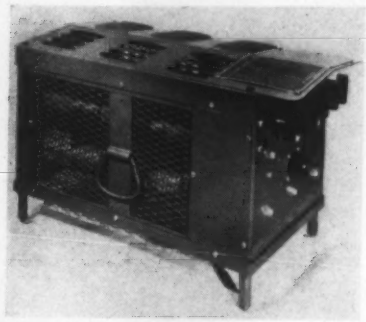
5- or 10-amp steps. Although they're primarily designed for direct-current metal-arc welding, the

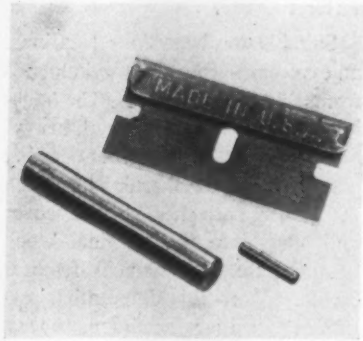


stations can also be used for gas shielded-tungsten arc and consumable-electrode processes (J. B. Nottingham & Co. Inc.)

For more data circle No. 66 on postcard, p. 247

Dowel Pins

Stainless-steel dowel pins can now be ordered as standards. Sizes are offered from 1/32-½ in. diam, in increments of 1/32 and 1/64 in. Tolerances are held to ±0.0002 in. in Type 416, 420, and 440 stainless steel. Drill-rod pins, hardened and ground to specs, will conform to material-standard drawings. In ad-



dition, special diameters, lengths, chamfers, bevels, materials, heat treatments and finishes are all available to meet special needs. (Star Stainless Screw Co.)

For more data circle No. 67 on postcard, p. 247

Indexing-Slide Table

Automatic multiple-work positioning in any desired number of cycles can be readily provided on both standard and special machine tools with a new indexing-slide

Choice of the wise buyer who compares...

CM HOISTS

CM METEOR ELECTRIC WIRE ROPE HOIST ½ to 5 ton capacities — Compact, enclosed design. Low headroom. Continuous duty motor with thermal overload protection for heavy duty service. Precision bearings and helical gears for long life. Only 110 volts at push button control. Hook suspension; plain, geared or motor driven trolley.

CM LODESTAR ELECTRIC CHAIN HOIST — ⅛ to 2 ton capacities — First truly heavy duty version of small electric hoist. ¼ ton model weighs only 51 lbs. Heavy duty self-adjusting brake, plus exclusive regenerative electrical braking. Upper-lower safety limit switches. CM-Alloy load chain. Single and three phase.

CM CYCLONE Hand Chain Hoist — ¼ to 10 ton capacities — Easy to carry. One ton model weighs only 36 pounds. Made of tough aluminum alloy. CM-Alloy load chain. High efficiency. Lifetime lubrication.

CM PULLER — "The One Man Gang" — ¾ to 6 ton capacities — Lifts or pulls at any angle. Lever handle operation Automatic load brake holds at any point. ¾ ton model weighs only 13 pounds and fits in a tool box. CM-Alloy load chain.

HAND OR ELECTRIC CHAIN OR WIRE ROPE
CM makes them all! So you can choose a hoist that's perfectly suited to your specific needs in a compact, rugged and safe CM design.

CM TROLLEYS AND CRANES

● **FOR OVER 75 YEARS,** Chisholm-Moore has offered hoist buyers the newest and most efficient designs, the most rugged construction, and the greatest number of valuable operating and safety features. CM hoists operate with a very minimum of maintenance. They give years of satisfying service.

Request catalog and name of local stocking distributor.

CM HOISTS

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Columbus McKinnon Corporation
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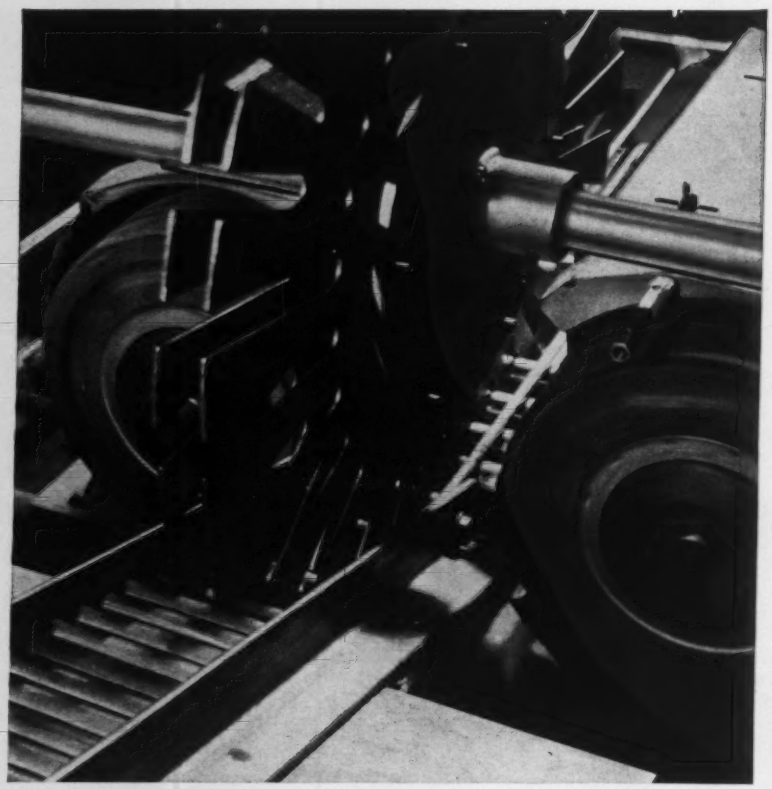
CLEVELAND • SAN FRANCISCO
In Canada: COLUMBUS McKINNON LIMITED, ST. CATHARINES, ONTARIO



SPECIAL POWER BRUSHING MACHINE at Kenmore Machine Products, Inc., Lyons, New York—uses "Ferris wheel" arrangement to index copper tubes past two Osborn 10" TY® brushing heads for deburring and edge-blending. Tubes are rotated through brushing cycle by endless belts. Machine is adjustable for various tube lengths and diameters. Rate for average 1" dia. part: 3300 pieces per hour.

SAVES $20,000 per year

deburring tubing with OSBORN power brushing

Before: this manufacturer of refrigeration components was using off-hand methods to remove end-burrs from rough cut-off lengths of copper tubing. Production was too slow . . . too costly.

Now: this specially-built automatic machine—equipped with Osborn TY® Master® Wheel power brushes—deburrs the tubes quickly, economically . . . edge-blends the tube ends smoothly, uniformly. *Production is over 8 times faster.* Consistently higher quality has eliminated the 100% inspection formerly required . . . *with total savings about $20,000 per year.*

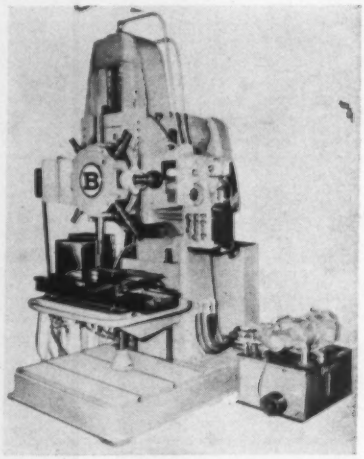
If you are interested in boosting output . . . improving quality . . . reducing costs on *your* metal finishing jobs of every type—deburring, cleaning, polishing, precision blending—an **O**sborn **B**rushing **A**nalysis can show you how. No cost or obligation. Write or call *The Osborn Manufacturing Company, Dept. F-114, Cleveland 14, Ohio. Phone ENdicott 1-1900.*

OSBORN

Metal Finishing Machines . . . and Finishing Methods
Power, Paint and Maintenance Brushes • Foundry Production Machinery

DESIGN DIGEST

table. This self-contained equipment includes a heavy-duty slide table with hardened ways and T-slots,



as well as a multi-station indexing mechanism with replaceable index-control bar. The table also comes equipped with a portable electro-hydraulic power pack with its own reservoir; and an automatic manual remote-control station. The latter mounts in any convenient location. (Russell T. Gilman, Inc.)

For more data circle No. 68 on postcard, p. 247

Limit Switch

Suitable for hazardous locations, an explosion-proof limit switch conforms with UL standards. The housing of the switch is a rugged, heavy-duty non-sparking aluminum casting with metal-to-metal seal. The switch mechanism attaches to the cover and plugs into the terminal block in the base. Mechanical features include short-trip differential, extreme repetitive accuracy, liberal safety overtravel and light operating force to trip. (R. B. Denison Mfg. Co.)

For more data circle No. 69 on postcard, p. 247

Valve Assemblies

An entirely new concept in ball-valve design boasts major improvements in sealing characteristics. It's a compact one-piece forging with built-in union ends. This simplifies installation, operation and maintenance. Engineered for rapid in-

stallation and fast disassembly for maintenance, the new ball valve can control the flow of liquids or gases. Only two steps are required for installation. The union ends are either screwed or welded on to the pipe ends. Then, a one-piece valve body is easily assembled to the union nut. Minor pipe misalignment is overcome by the union ends. In addition, the simplified design of the valve body and union ends eliminates the need for nuts and bolts and an extra union in the line. (Clayton Mark & Co.)

For more data circle No. 70 on postcard, p. 247

Specialty Welding

Three new bronze alloys for specialty-welding applications are available from the same company. One of these newcomers is a low-fuming bronze with a high quality analysis. Sufficient viscosity in the molten deposit has been engineered into this alloy to give operators maximum control of bead formation at all times. The ultimate tensile strength of this alloy is 55,000 psi. A Spoolarc silicone-bronze alloy and a phosphor-bronze alloy round out a full line. The silicone-

bronze alloy is designed for welding silicone-bronze plate and cast materials. It's also useful in welding copper and copper-base materials. Phosphor-bronze rods serve in joining, repairing and building up bronze alloys. They're also adapted to welding dissimilar metals such as ductile iron to high-alloy steel. Other typical uses for the phosphor-bronze rods include:

Fine tools that encourage Good Work

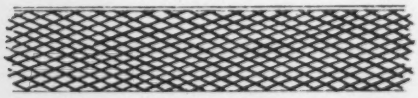
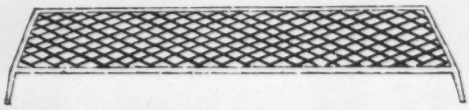
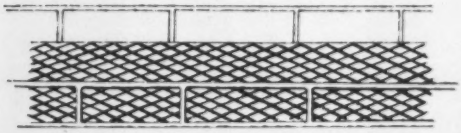
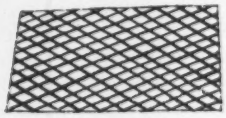
ARMSTRONG WRENCHES

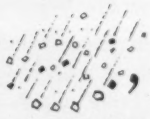
An ARMSTRONG Wrench feels right—is balanced. It goes over nuts or screw heads easily, grips firmly without sloppiness, won't round corners—because openings are carefully machined to correct sizes. It's safe, strong beyond need without clumsy bulk—because of superior design and selected steels, heat treated to proper degree of hardness and tensile strength. It's quality finished, ARMALOY (alloy steel) Wrenches in chrome plate with heads buffed; HI-TEN (carbon steel) Wrenches in baked-on gray enamel with heads ground bright . . . all plainly marked for size. All are uniformly excellent tools manufactured under strict quality control, by modern methods, with modern equipment in a modern tool plant . . . 1537 different industrial sizes and types —single wrenches, or sets in metal cases, boxes or rolls . . . each a quality tool. Armstrong Wrenches are "Fine tools that encourage good work."

ARMSTRONG BROS. TOOL CO. 5209 W. Armstrong Ave. Chicago 46, U.S.A.

AJAX ability to handle angular and offset misalignment totaling 7 degrees and more is preventing breakdowns, relaxing production tolerances, cutting assembly and maintenance costs. *Write for catalog.*

AJAX FLEXIBLE COUPLING CO. INC.
137 Portage Road Westfield, N. Y.
Incorporated 1920 *Representatives in Principal Cities*

Today, you'll find more and more walkways  , stairs , mezzanines  and skywalks  are made of Wheeling Expanded Metal  .

That's because unwanted rain , snow , sleet  , mud , oil and grease go right through it . So does light , heat and fresh air . No wonder it pays

to specify Wheeling Expanded Metal!

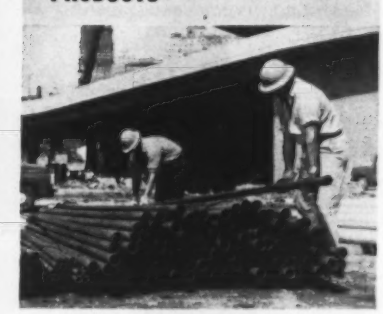
Wheeling

WHEELING CORRUGATING COMPANY • IT'S WHEELING STEEL!

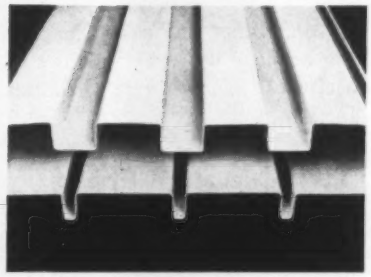
Steel

Warehouses: *Boston, Buffalo, Chicago, Columbus, Detroit, Kansas City, Louisville, Martins Ferry, Minneapolis, New York, Philadelphia, Richmond, St. Louis.* Sales Offices: *Atlanta, Houston, New Orleans.*

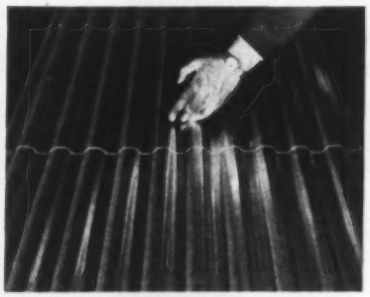
OTHER WHEELING PRODUCTS



Wheeling Continuous Weld Steel Pipe gives strong, dependable, low-cost service . . . usually outlasts the building itself.



NEW, STRONGER Wheeling Super-Rib Steel Roof Deck has an exclusive vinyl protective coating . . . comes in unlimited lengths.



Wheeling Tensilform® . . . with conventional or light aggregate concrete . . . gives structures excellent lateral stability.

Wheeling SofTite® Cop-R-Loy® Galvanized Steel Sheets, for heating and air-conditioning ducts, will not flake or peel under rough use.

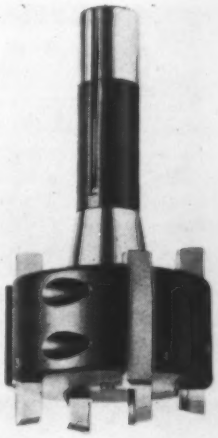
DESIGN DIGEST

Overlays on ferrous alloys, repair of manganese-bronze ship propellers and rebuilding of brass arsenal hoppers. (All-State Welding Alloys Co., Inc.)

For more data circle No. 71 on postcard, p. 247

Cuts Four Small Chips

A new progressive-step fly bar is designed to provide fast stock removal that cuts lathe time. Radial steps, designed into the one-piece body of the bar, take four small chips instead of one large chip. This eliminates vibration and excessive wear on machine spindles. The fly bars are available in a 40

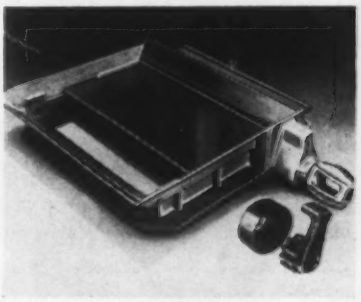


National taper, No. 9 Brown & Sharpe; and an R-8 taper with ⅜-in. wide slots to accommodate tools. (Lido Tools)

For more data circle No. 72 on postcard, p. 247

Geared Gate

Equipped with a reduction-gear unit, that delivers three times the opening force of direct-drive units, this new hopper-car discharge gate can be opened by one man alone without excessive effort on his part. This easy opening is expected to eliminate the tendency of workers to sledge, or otherwise damage cars, in futile attempts to release "frozen" hopper doors. The 6:1 geared reduction enables an average man to exert an opening force of 19,000 lb with a 5-ft bar. In addition, the mating surfaces of the discharge gate are designed to prevent lading losses of even the finest materials. They also provide smooth bind-free operation. Use of electric-steel cast-



ings throughout makes the gate rigid and free of distortion. (Wine Railway Appliances, Unitcast Corp.)

For more data circle No. 73 on postcard, p. 247

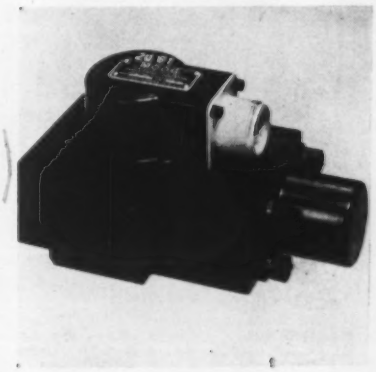
Stress-Strain Gage

Here's a unit that takes the task out of obtaining stress readings in many tests and measurements. It's a strain gage with a built-in computer that solves general strain-to-stress equations. Time-consuming calculations of stresses from strain indications are unnecessary. Two sensing elements, orientated 90° apart, measure stress along the principal axis—strain in both axial and transverse directions. (Baldwin-Lima-Hamilton Corp.)

For more data circle No. 74 on postcard, p. 247

Servovalves

These new servovalves boast three unusual features that overcome the problem of oil contamina-



tion. First, the use of an internal, mechanical feedback provides high spool-positioning force. There's

also a large pilot-stage filter that's easily replaced in the field. Thirdly, an optional, separate, pilot-supply port lets you use a second oil supply. This additional oil source may be at higher pressure, and subject to more filtration, than the second-stage supply. The valve comes in flow ratings of 1, 2½, 5, 10 and 15 gpm at 1000-psi pressure drop and maximum signal. Completely-symmetrical design minimizes null shift due to pressure or temperature changes in the valve. In addition, rugged steel-body construction lets the new units stand up under heavy industrial useage. (Moog Servocontrols, Inc.)

For more data circle No. 75 on postcard, p. 247

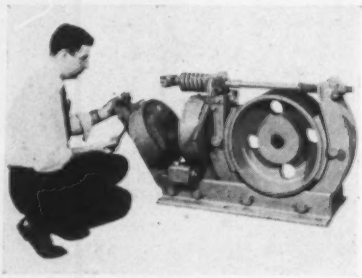
Controls Motor Speed

A complete line of ac-supplied, variable-speed controls handles dc motors from 1/12-3 hp. The controls connect easily to any standard shunt- or compound-wound dc motor, and provide infinitely-variable speed control from zero to maximum motor rpm in either direction. Units are easily installed and serviced by regular plant electricians. (Pacific Industrial Controls, Inc.)

For more data circle No. 76 on postcard, p. 247

Twin-Magnet Brake

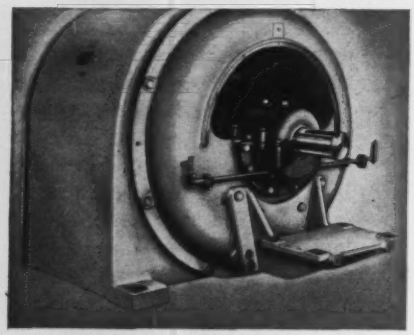
New, dc-magnetic brakes are available for heavy-duty, steel-mill and crane service. They can also supply the braking force for hoists, conveyors, screwdowns and ore bridges. The newcomers feature increased speed, reliability and reduced upkeep. In fact, forward-looking design makes even in-use maintenance simpler, faster and easier to perform. Another outstanding feature is mechanically-independent twin magnets. Either or both can be removed without releasing the brake shoes. If necessary, you can also replace the coil while the equipment is under load. The whole magnet assembly can be removed and replaced or repaired, without releasing the braking action or disturbing the torque setting. (Westinghouse Electric Corp.)



For more data circle No. 77 on postcard, p. 247

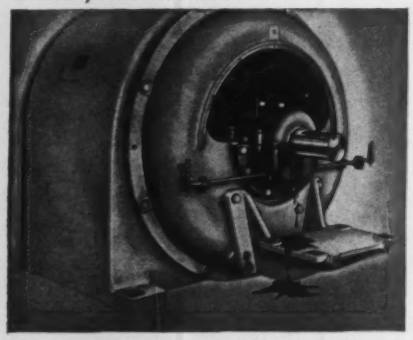
NON-FLUID OIL
TRADE MARK REGISTERED

For Motor Lubrication



NON-FLUID OIL stays in

Ordinary oils leak out



When you use NON-FLUID OIL as the lubricant for your ball bearing type motors, you will find that it "stays alive" longer, providing effective lubrication and saving on maintenance cost. NON-FLUID OIL does not pit or discolor the finest steel surfaces. Unlike ordinary grease it does not alter with age, heat or exposure and contains nothing that can decompose or become acid.

If you operate sleeve-bearing, ring-oiling type motors, lighter grades of NON-FLUID OIL give equally important benefits. They outlast the highest quality fluid oils because they do not leak out, creep, or throw onto armatures to cause burnt-out windings from oil-soaked insulation. With NON-FLUID OIL as your lubricant, "downtime" is avoided and steady profitable operation assured.

Whatever type motor you use, we suggest that you try NON-FLUID OIL as the lubricant. Write today for a free testing sample and Bulletin 504.

1898 65 YEARS 1961

NEW YORK & NEW JERSEY LUBRICANT COMPANY
292 Madison Ave., New York 17, N.Y.
WORKS: NEWARK, N.J.

WAREHOUSES: • ATLANTA, GA. • BIRMINGHAM, ALA. • CHARLOTTE, N. C. • CHICAGO, ILL. • COLUMBUS, GA. • DETROIT, MICH. • GREENSBORO, N. C. • GREENVILLE, S. C. • PROVIDENCE, R. I. • ST. LOUIS, MO. • Also represented in principal industrial centers, including, Pittsburgh, Pa., Cleveland and Cincinnati, Ohio.

NON-FLUID OIL is not the name of a general class of lubricants but is a specific product of our manufacture. So-called grease imitations of NON-FLUID OIL often prove dangerous and costly.

NEW PATENTS

Iron-Ore Treatment

Treatment of iron ore, W. C. Schreiner and D. F. Palazzo (assigned to M. W. Kellogg Co.), July 25, 1961. In the recovery of high-grade, ferric-oxide concentrate suitable for smelting, low-grade or medium-grade iron ore is first converted to the ferrous-oxide form. Then it's chlorinated. The condensed ferric-chloride vapor that results is heated with an oxidizing agent. U. S. 2,993,759.

Alloy Resists Oxidation

Oxidation-resistant, iron-chromium alloy, J. A. McGurty and J. F. Collins (assigned to General Electric Co.), Aug. 1, 1961. A high-temperature alloy having improved workability consists of 0.5-1 pct Pd, 0.5-3 pct Y, 35-50 pct Cr, and the balance substantially all Fe. U. S. 2,994,604.

Passivating Technique

Method for passivating metal powders, A. Gatti (assigned to General Electric Co.), July 25, 1961. Patent covers a passivating method in which sub-micron sizes of iron, nickel or cobalt powders contact nitrogen. This renders them non-pyrophoric in the presence of oxygen. U. S. 2,993,467.

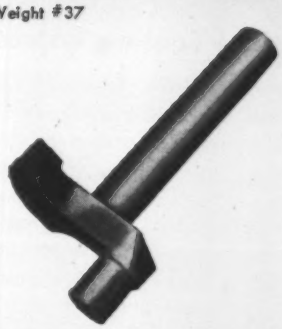
Steelmaking Method

Method of making steel, W. L. Kerlie (assigned to U. S. Steel Corp.), July 25, 1961. Method for making steel in a regenerative furnace which permits use of an increased proportion of scrap. The scrap is charged and heated first. Then, molten-pig iron and lime are added. Finally, an oxygen-containing gas is introduced at a pre-determined rate. This controls the rate of carbon removal, and improves fuel economy. U. S. 2,993,781.

Copies of U. S. Patents are available at 25¢ each from Commissioner of Patents, Washington 25, D. C.

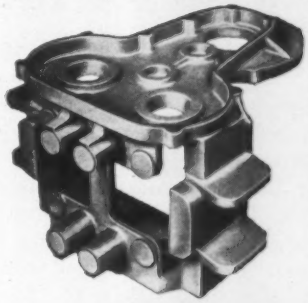
URICK'S DUCTILE IRON

Weight #37



Weight #62

Weight #41



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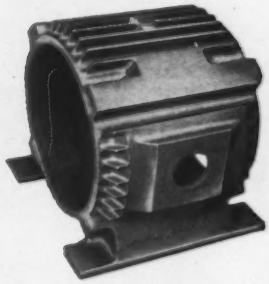


. . . PRODUCTION RUNS with a custom finish

URICK successfully casts many small parts or components of Ductile iron on a production basis. Because of URICK'S team "know-how" and modern facilities, these precision castings are no longer considered a custom task involving added expense and time, but are mass produced with effective savings. Naturally URICK'S knowledge of stress, strain, and impact values helps in recommending Ductile where it will serve best. Possibly you have components that URICK can help you convert to Ductile to your advantage. Remember, castability, weight reduction and reduced machining time with longer tool life, all add up to real economies. Ask URICK about their Ductile recommendations before you decide on your next casting run.

URICK is the foundry that starts with "U" and stays with YOU. Write for bulletins on URICK'S Ductile and Urite casting facilities.

URICK FOUNDRY

ERIE, PENNSYLVANIA

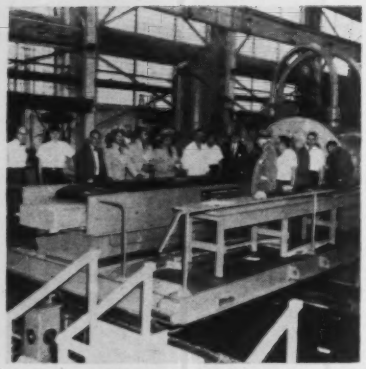
LICENSED UNDER PATENTS OF THE INTERNATIONAL NICKEL COMPANY, INC.

New Equipment and Machinery

Optical Tooling Points Way to Higher Accuracy

As the need for closer tolerances becomes more and more critical, manufacturers are turning to optical tooling. With optics, many companies obtain tight tolerances quickly and efficiently. A multi-purpose tool, which is in effect a 360-sided optical polygon, checks alignment and angular spacings in any multiple of full degrees. When it's used with an autocollimator or similar optical-sighting device, this optical polygon provides an accurate mirror surface which reflects a projected image of the sighting device's cross hairs. A magnifying glass makes viewing easy. And a magnet holds the instrument in the desired test position. (Michigan Tool Co.)

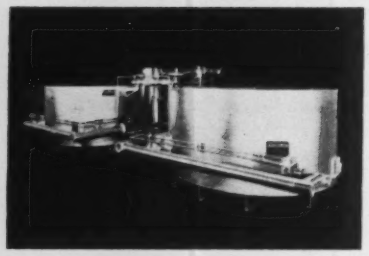
For more data circle No. 78 on postcard, p. 247



Hydraulic Press Exerts 63,000-Ton Pressures

Weighing in at about 500,000 lb, a new press is rated at 41,000 tons capacity for forming missile and aircraft parts. On test runs, this giant delivered a whopping 63,000 tons of forming capacity. A fluid cell, mounted on top of the pressure cylinder, provides the forming pressure. This cell is inflated with hydraulic fluid. Then the forming pressure acts on metal blanks which are arranged on a tray. As the fluid cell expands, it fills the unoccupied area within the cylinder. This action shapes the metal blanks around forming blocks. A master control console with two auxiliary stations regulates all press actions. Less than two minutes are required to complete each forming cycle. (Verson Allsteel Press Co.)

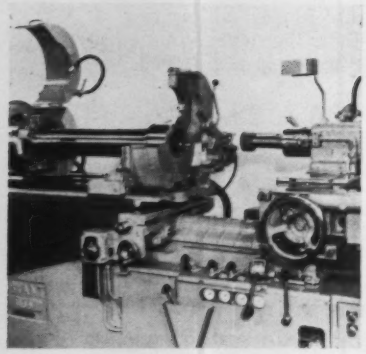
For more data circle No. 79 on postcard, p. 247



Pot-Type Furnace Melts and Holds Various Metals

Specifically engineered for melting and holding zinc, aluminum, magnesium, lead and Kirksite, as well as other nonferrous metals, a new line of pot-melting furnaces boasts low fuel consumption. High-grade insulated linings keep heat loss to a minimum. A new-style combustion chamber and flue-area design insure uniform circulation and even heat distribution over the entire pot surface. Single-valve control is standard. (J. A. Kozma Co.)

For more data circle No. 80 on postcard, p. 247



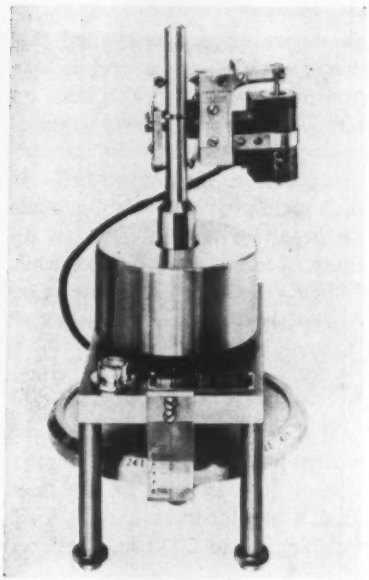
Precision Grinder Incorporates Extra-Long Bed

Four feet longer than standard models, a special internal grinder is shaping the bores and faces in precision machine tool spindles and similar workpieces. Each workpiece is driven by a six-jaw chuck at the workhead end of the machine. A steady-rest supports the opposite end of the work in process. Both the steady-rest and the workhead are supported on and positioned by two parallel ground ways. A third parallel way is furnished for mounting gaging equipment. This special grinder swings parts up to 16 in. in diameter and grinds holes up to 9-in. deep. Tapers up to a 30° included angle can be ground. When a special spindle is supplied, extra-long workpieces are easily handled. (Bryant Chucking Grinding Co.)

For more data circle No. 81 on postcard, p. 247

Linear Gaging Device

Are your strain instruments providing accurate test data? When was your stress-strain recorder calibrated last? If you're not sure of your present test results, perhaps it's time to check out the calibration of your precision strain-measuring instruments. You can do it yourself, in your own lab. A new linear measuring device monitors measurements from 0.005-1.0 in. It can be dialed to within 0.00005 in. Rotation of a graduated dial, which is connected to a micrometer screw, moves the upper part of a two-section spindle. This accurate vertical displacement



activates the strain instrument—usually an extensometer—that's being checked. As the extensometer's moving knife opens, its motion is electronically magnified. Then, the motion produces a measurable line on an attached recorder. This line is easily checked against the calibrator's setting. (Tinius Olsen Testing Machine Co.)

For more data circle No. 82 on postcard, p. 247

One-Pass Turning

Contour turning of round, square and hexagon-bar stock is fast and easy on a new, centerless, shaft-turning machine. Using an unusual concept of tracer turning, the newcomer features a rotating-bar stock support that's adjacent to, and

2-A, 16-B:C
10-POUND

3-A, 20-B:C
20-POUND

NEW KIDDE TRI-CLASS-ABC UNITS APPROVED FOR A, B, C, FIRES!

U.L.-approved for use on all three classes of ordinary combustibles, flammable liquids, and electrical fires, new 10 and 20-pound Kidde dry chemical portables now simplify the job of fire-fighting, eliminate the possibility of error in matching the extinguisher to the fire hazard. Both make the job of training personnel easier, since they feature simple, two-step operation. Just aim, and pull the trigger . . . fire is smothered in seconds.

Tops in performance and quality, pressurized Kidde Tri-Class-ABC 10 and 20-pound portables release a powerful, non-turbulent dry chemical stream to insure dependable, fast-acting fire protection. Simple recharging means that once used, your units are quickly put back in service. In addition to full U.L. approval, both units are approved by Factory Mutual Laboratories. For more information on these easy-to-use portables, write to Kidde today!

Kidde

Industrial and Marine Division

Walter Kidde & Company, Inc., 949 Main St., Belleville 9, N. J.

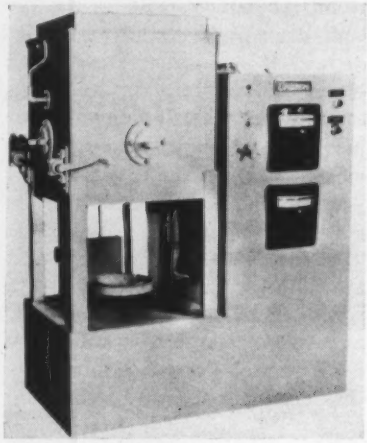
Walter Kidde & Company of Canada Ltd., Montreal — Toronto — Vancouver

travels with, the turning tool. Because the bar-stock collect support is always close to the turning tool, there's no need for a tailstock center. Rotating collet, tool and temphite follower assembly, and template back-up roller are all housed in one casting that's mounted on the carriage. The extreme rigidity of this combination allows higher surface speeds and feeds. At the same time, it maintains close tolerances with extremely-fine finishes. With almost fully-automatic operation and simplified push-button controls, an operator can often handle more than one machine. (Taber Instrument Corp.)

For more data circle No. 83 on postcard, p. 247

Crucible Furnaces

Manually-operated bottom-loading crucible furnaces are recommended for use at temperatures from 1400°-2800°F. Each furnace has a heating chamber that measures 4 x 4 x 9 in. high. A vertical-

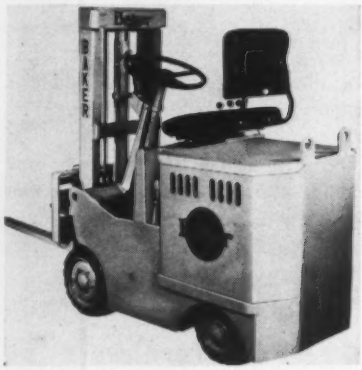


lift device eases loading and discharge work. After the work is lowered from the chamber, it rests on a roller conveyor for easy removal or pouring. All controls are contained within the unit's shell. In addition, a provision has been made for passing a flow of inert gas directly over the work charge, when desired. (Lindberg Engineering Co.)

For more data circle No. 84 on postcard, p. 247

Compact Lift Truck

With a 59-in. turning radius and a right-angle stacking-aisle dimension of 70⅜ in. plus the length of load, a new lift truck handles loads weighing up to 2000 lb. Designed



for easy servicing and heavy-duty operation, the truck is powered by a standard 18-cell, 15-plate battery that provides a full 36-v service. Easy steering is insured by a recirculating ball-type steering gear. Excellent brake efficiency permits

Stamco has a new, compact and streamlined design

...Rated 3 cuts of 3/16" mild steel.

Important advances in design and material make this unit the finest at the lowest possible cost.

Stamco is proud to announce the "All Purpose" Slitting and Coiling line. Years of engineering study have resulted in the development of this outstanding slitting equipment. These years of research are reflected in unusual features of this line.

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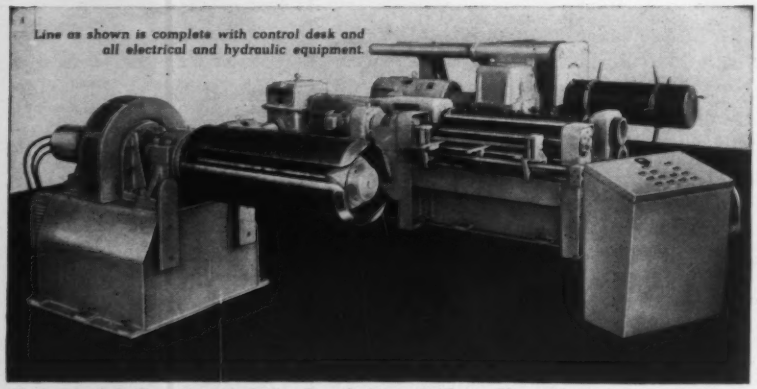


Line as shown is complete with control desk and all electrical and hydraulic equipment.

Slitting and Coiling Lines • Cut-to-Length Lines • Flying Shear Lines • Power Squaring Shears • Continuous Process Lines • Ferrous & Non-ferrous Mill Equipment

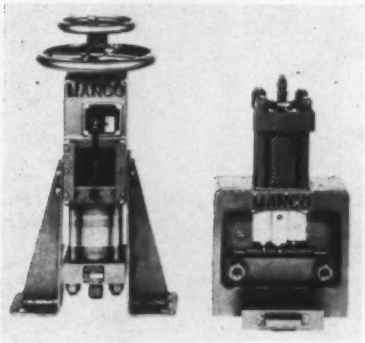
Stamco, Inc.
New Bremen, Ohio, U.S.A.

the truck to be stopped easily on a 15-pct grade with light brake pressure. (Otis Elevator Co., Baker Industrial Trucks Div.)

For more data circle No. 85 on postcard, p. 247

Cold-Heading Testers

Two companion units of hydraulic equipment team up to yield reliable test data on the cold heading of mild steels. One of these units is a shear tool. It's used for cutting metal slugs to a required length. Cutting time is 1½ seconds. Its mate does the actual upset testing. In the upset tester, a hydraulically-actuated ram performs the test cycle in 2½ seconds. Both units are powered by a single motor-driven pump. This pump delivers 3 gpm

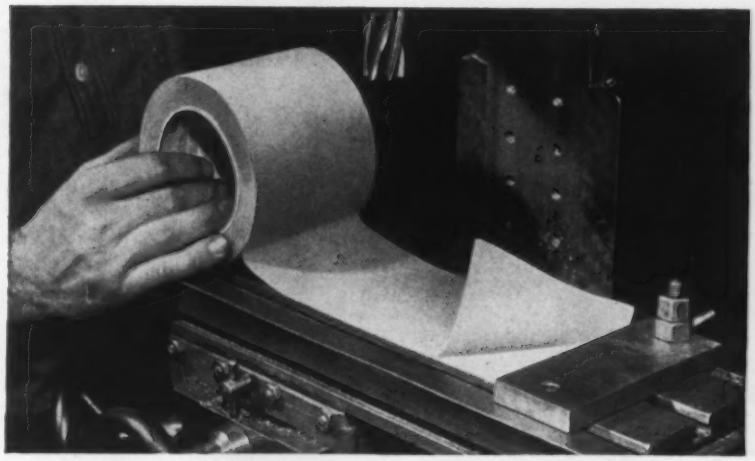


and provides a 35-ton thrust. Weight of the shear unit is 70 lb. The upset tester weighs in at 90 lb. (Manco Mfg. Co.)

For more data circle No. 86 on postcard, p. 247

Aids Steelmaking

Here's an advance that helps speed the open-hearth steelmaking process. It's a pneumatic system for handling dolomite, lime and ore. The manufacturer feels it is the first major change in placing dolomite and handling other materials in the last 25 years. The complete system uses centralized off-the-floor storage bins, blowers and activators at the lower-furnace level, pneumatic delivery to a cyclone receiver, overhead monorails, batch hoppers, and a mechanical thrower to place the refractory material onto the furnace walls. Dolomite, itself, is a carbonate of lime and magnesia in granular form. It rebuilds eroded backwalls and bottoms which may



holds any metal like a magnet!

lock down nonferrous metals for milling with double-coated

TAPES FROM 3M

Keep nonferrous or small, hard-to-clamp parts where you want them during machining and finishing operations. "Scotch" Brand Double-Coated Tape goes on quickly . . . holds tight even under a flood of cutting fluid. This "tape that sticks on both sides" speeds such operations as cutting, grinding, milling and polishing.

TRY THIS METHOD. Ask your nearest "Scotch" Brand Tape Distributor to demonstrate this and the many other "Scotch" Brand Tapes for masking, surface protection, and metal finishing. Or, write: 3M Co., 900 Bush Ave., St. Paul 6, Minn. Dept. IBU-91.

SCOTCH BRAND tapes for industry

Minnesota Mining and Manufacturing Company

. . . where research is the key to tomorrow

"Scotch" is a registered trademark of 3M Co., St. Paul 6, Minn.

OOPS! Furnace down! Pouring schedule imperiled!

Maybe our cartoonist exaggerated the effect of this news on the Inductotherm offices, but at least he gives you the general idea.

Trouble doesn't often develop in Inducto high frequency induction furnaces. When it does, however, Inductotherm believes in doing something constructive about it—and pronto!

Here, in the customer's own words, is what happened:

"Inductotherm's 24-hour service saved our casting schedule,"

says SAM MINIEA, President, Truecast Precision Casting Corporation, Louisville, Kentucky.

"We were working a 24-hour, 7-day week schedule when our only melting furnace started delivering only half power. A hurried call to Inductotherm brought an engineer to our plant Saturday morning to diagnose and repair trouble in a loose rheostat brush. Thanks to this service expensive down-time was less than 24 hours."

Helpfulness on melting problems and the promptest kind of service to large and small customers alike is a big part of Inductotherm's concept of doing business—that plus a complete line-up of the finest kind of furnace equipment we know how to build. And it all adds up to saving you money. For the entire story, why not talk with an Inducto furnace engineer soon! Inductotherm Corporation, 10 Indel Avenue, Rancocas, New Jersey.

INDUCTOTHERM

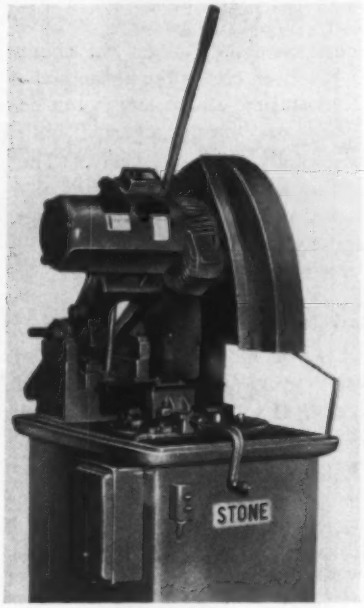
Subsidiary for 60-cycle melting equipment—INDUCTOTHERM LINEMELT CORP.

occur in the furnace lining during a heat. There are two big advantages to the new system. It clears the charging floor of material and handling equipment. It also frees hot-metal cranes for other vital functions in different areas of the plant. (The Blaw-Knox Co.)

For more data circle No. 87 on postcard, p. 247

Cut-Off Machine

With a 15-hp motor, a rugged cut-off machine handles a wide range of ferrous and nonferrous

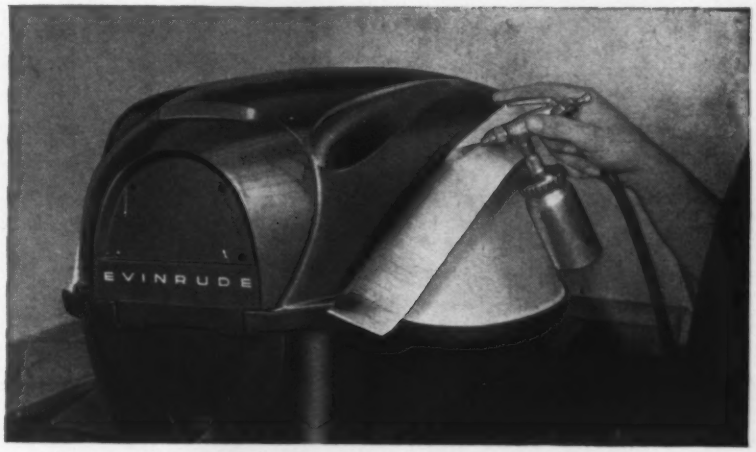


metals. It's available in either a 20-in. or a 24-in. size. And it may be equipped for wet or dry cutting. You also have a choice of manual, semiautomatic or fully-automatic operation. A fast-acting self-centering vise with adjustable jaws clamps the work close to the cutting edge—regardless of the angle of the cut. This vise, mounted on a smooth-surfaced table, is machined for jigs and fixtures. It's adjustable for angular cutting to 46°. (Stone Machinery Co.)

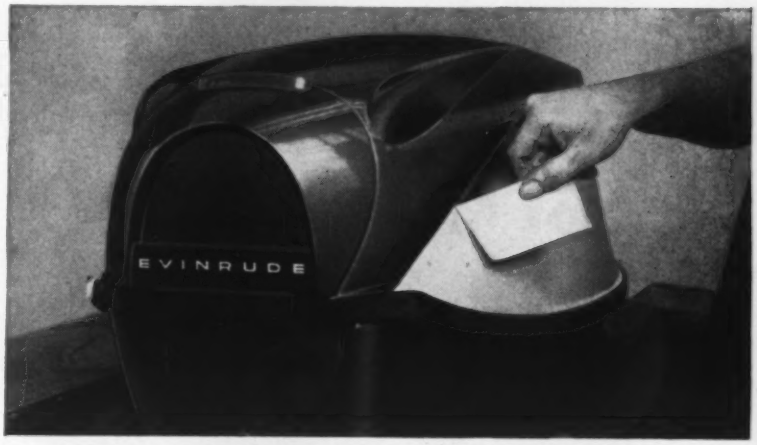
For more data circle No. 88 on postcard, p. 247

Automatic Sandblaster

As easy to operate as its name, the ABC sandblaster automatically performs all kinds of flat surface



final touch-up
fast and clean!



fine-line separations between colors made sharp with masking

TAPES FROM 3M

The final touch of quality for Evinrude outboard motors goes on easily and quickly with the help of masking tapes from 3M. After motor shrouds are covered with flexible shields and sprayed, separation between colors is ragged. Application of "Scotch" Brand Masking Tape and a quick final touch-up spray makes the separation sharp and clean.

TRY THIS METHOD. See how it speeds finishing operations and improves results. Ask your 3M Representative or nearest "Scotch" Brand Tape Distributor for a demonstration, or write: 3M Co., 900 Bush Ave., St. Paul 6, Minn., Dept. IBU-91.

SCOTCH BRAND
tapes for industry

Minnesota Mining and Manufacturing Company
...where research is the key to tomorrow

3M COMPANY

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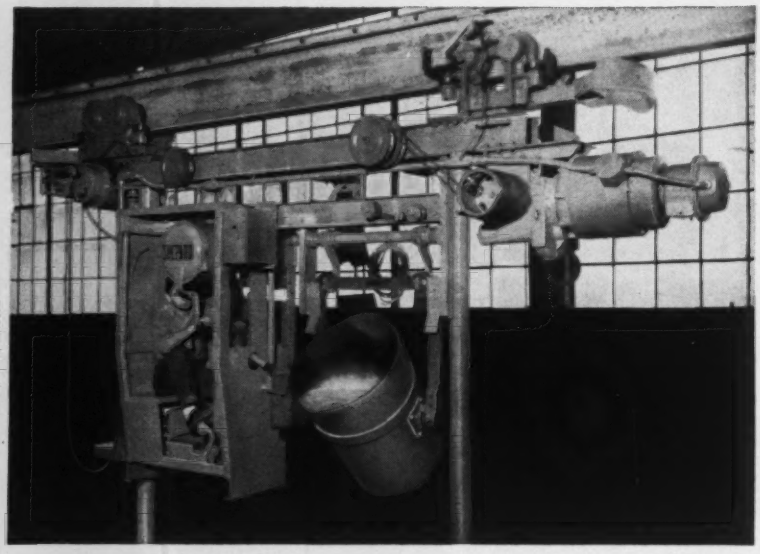
JOB-MATED



for Hot Metal Handling

Shepard Niles Hot Metal Carrier

It only takes **one man** to move and pour hot metal — swiftly and safely — with a Shepard Niles Hot Metal Carrier. And because each carrier is **JOB-MATED** — built with the components best suited to meet **your** exact on-the-job conditions — it will last longer, require minimum maintenance and practically no downtime. Care like this in our plant means significantly lower cost operation in yours.

For full details on this labor-saving method of low-cost handling, write for latest bulletin. Ask to have a Shepard Niles representative call.

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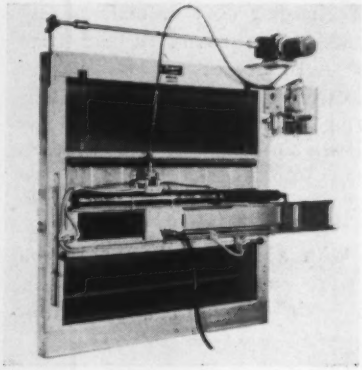
NEW EQUIPMENT

cutting with uniformity and precision. Operators throughout the country who are using the machine

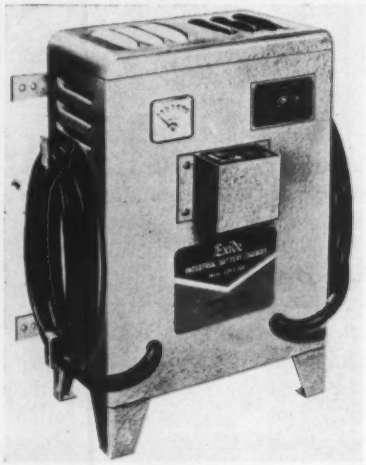


report savings on labor run about 40 pct over conventional methods. Speed and the stroke length can be quickly and easily adjusted both horizontally and vertically. The blasting nozzle travels automatically in a continuously-overlapping zig-zag pattern. (The Will-Burt Co.)

For more data circle No. 89 on postcard, p. 247

Charges Batteries

Do you have a battery problem with your light-duty industrial trucks? If so, a handy charger may be just what you need. It puts new



zip in 12-, 24- or 36-v lead-acid batteries. (Exide Industrial Marketing Div., The Electric Storage Battery Co.)

For more data circle No. 90 on postcard, p. 247

Aluminum Bulkheads

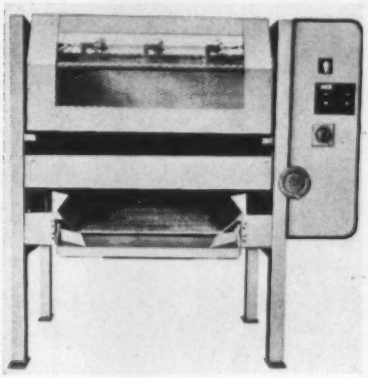
Weighing one third less than steel units, a new aluminum bulk-

head improves material handling in railway-freight cars. In fact, one man handles the partition without any strain. Also, single-lever control permits full-circle turning. Thus, fork-lift trucks suffer no interference because the bulkhead hugs the wall. Another advantage is that the bulkheads hang from traveling beams spanning the car's width. These beams are roller mounted on tracks which run along the car's roof. Four pins securely lock the bulkheads in place. They install in standard freight cars and in refrigerated or insulated cars. Advantages include less dead weight, corrosion and heat resistance. (Reynolds Metals Co.)

For more data write No. 100 on postcard, p. 247

Barrel Finisher

Power-driven screen separation and high-speed operation are prime

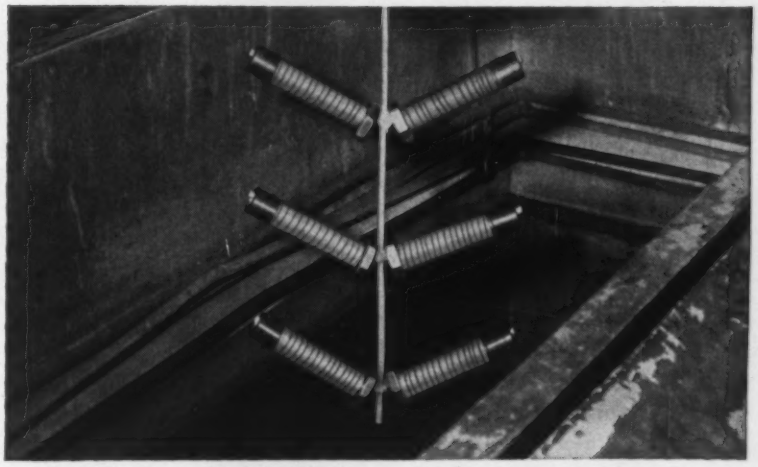


features of a 20.7 cu ft capacity barrel-finishing machine. Other models are available with capacities down to 4 cu ft. Speeds are variable from 10-36 rpm. The screen traverse movements are adjustable from 0-1½ in. Each separating screen operates at 350 reciprocations per minute. (Rampe Mfg. Co.)

For more data write No. 101 on postcard, p. 247

Thread-Rolling Unit

Designed for the heaviest thread-form, spline- and gear-rolling jobs, a new machine provides rolling forces up to 100 tons. Nominal diametrical capacity is from 0-6 in. maximum for infeed rolling; from 0.4 in. maximum diameter for through-feed rolling. Electronically-controlled infeed cycling and variable infeed-stroke length makes the



mask simple shapes or complex contours

plating solutions can't creep under these tight-sticking

TAPES FROM 3M

Stop-off masking and rack wrapping are fast, easy, sure when you choose tapes from 3M for the job. "Scotch" Brand Electroplating Tape No. 470, developed especially for plating applications, is strong, conformable and has a backing that resists effects of most solutions.

Other electroplating tapes too: one that's extremely thin, tough, transparent; another backed with lead foil for use where "thieving" action is required.

TRY THIS METHOD. Ask your 3M Representative or nearest "Scotch" Brand Tape Distributor for a demonstration, or write: 3M Co., 900 Bush Ave., St. Paul 6, Minn., Dept. IBU-91.

SCOTCH BRAND tapes for industry

Minnesota Mining and Manufacturing Company

...where research is the key to tomorrow

3M COMPANY

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machine very versatile. The major bed is a 3-in. steel plate. It provides great mechanical stability. Summing up, the unit offers power, rigidity and speed for top efficiency within its rated loading capacity. (The Landis Machine Co.)

For more data write No. 102 on postcard, p. 247

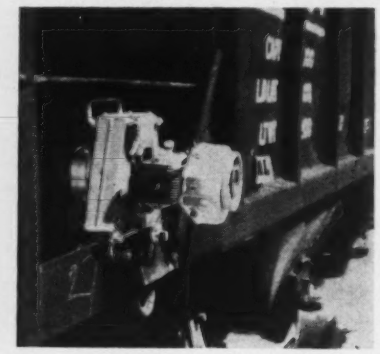
Ups Pre-Form Densities

Ushering in improved powdered-metal fabrication methods, a new vibrating compaction machine yields extremely high pre-form densities. As a result, production costs nose-dive. Capital costs also come down. A dynamically - balanced variable vibrator provides the impact force. It delivers ten times the kinetic energy of the same-sized conventional unit. Accelerations over 20,000 times the force of gravity have been induced in powder specimens to achieve high densities. In fact, samples have been compacted to over 90 pct of the theoretical limit with this equipment. Frequencies range between zero and 500 impacts per minute. However, air consumption is surprisingly low. The control console places accurate, dynamic control of the machine at the operator's fingertips. (The Branford Co.)

For more data write No. 103 on postcard, p. 247

Vibrates Hopper Cars

At 3000 rpm, a hopper-car vibrator produces an unbalance

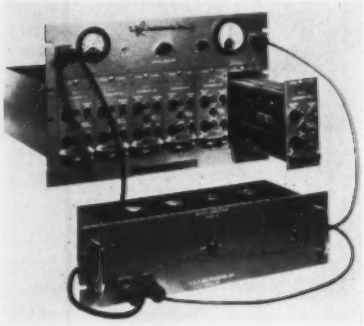


force of 6600 lb. It's capable of moving hard-to-handle materials such as wet sand, cement, gravel, coal, iron ore, rock phosphate, etc. A built-in mounting clamp insures secure attachment to any rigid angle. Thus, one man can perform all unloading operations without getting into or under the car. The vibrator unit weighs 77 lb. No external power source is required. This makes the portable gasoline-operated unit ideal for remote-site unloadings. (Martin Engineering Co.)

For more data write No. 104 on postcard, p. 247

Balances Strain Gages

A modular strain-gage and transducer-input conditioner accommodates any type of resistance strain gage and transducer. It furnishes well-regulated bridge excitation while providing automatic servo balancing, sensitivity control and automatic calibration. Each channel is completely isolated from ground and from all other channels. The



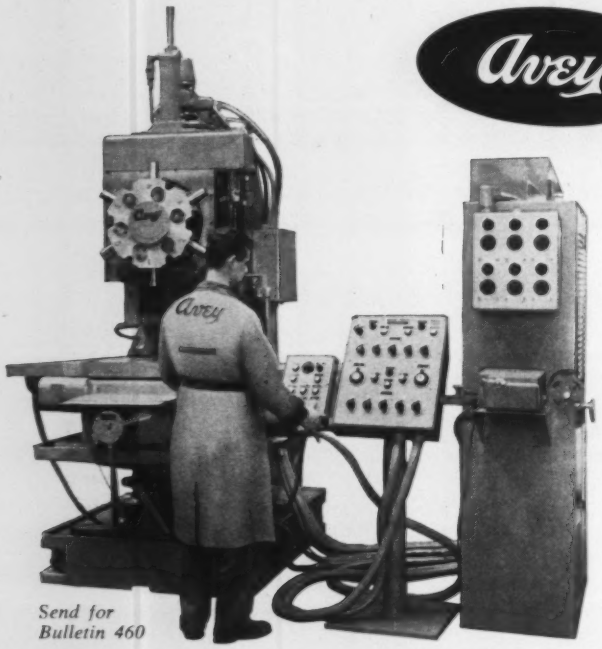
output can feed single-ended or differential amplifiers. (B & F Instruments, Inc.)

For more data write No. 105 on postcard, p. 247

Advanced Lathe

By pushbutton operation, speeds from 300-3500 rpm are available on a precision lathe. A 1:1 pulley ratio teamed up with a new electronic motor drive provides the key to this performance. With a 2:1 pulley jump, 600-7000 rpm are possible. The drive can be jogged and reversed by turning a switch on the up-to-date control station. It also has dynamic braking and it will not slow down with an increase in load. A voltage-drop compensator keeps the motor at constant speed. The lathe itself features a double-com-

6 precision spindles by Avey



Send for Bulletin 460

You can get this rugged Avey 250 Turret-Dex with either automatic or numerical controls. Rotary, 2- or 3-axis positioning. Pre-selected speeds, feeds, rapid advance, tapping cycles. Automatic depth control all spindles; automatic turret clamp; positive spindle stop; skip index. Capacity to 1¼". Eight spindles optional. Avey, Box 1264, Cincinnati 1, Ohio.

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Ask the Crucible inside salesman for any type, form, size and quantity of special purpose steel. He'll confirm immediate delivery from stocks on his own center's floor.

His center is literally a "one-stop" source for thousands of steel items, in quantities from less than a pound to over a ton. Suppose you need a dozen different types of tool steel, for example. He can fill *all* the requisitions — for air-, water-, oil-hardening types; hot work tool steels; high speed steels; or others. Or suppose you need stainless. His in-stock records show more than 20 types in all forms, finishes, sizes. The same holds true for alloys, free machining steels, drill rod.

He can also process your requisition through other Crucible steel centers or mills. He's linked by teletype with an electronic computer for inventory control at Crucible headquarters. So, he can make arrangements for immediate delivery while you're on the phone. It's the fastest and most extensive communications system in the business.

For information, call the local Crucible steel center or write: *Crucible Steel Company of America, Four Gateway Center, P. O. Box 88, Pittsburgh 30, Pa.*

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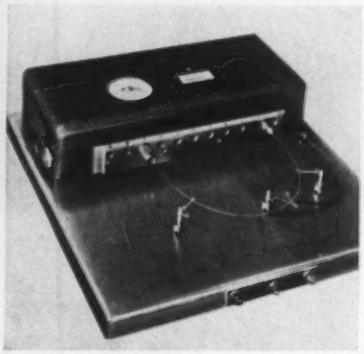
pound slide rest, screw tailstock and steel cabinet. A two-speed motor and drive is also available. (F. W. Derbyshire, Inc.)

For more data write No. 106 on postcard, p. 247

Tests Wire Fatigue

Using the rotating-beam method, a new fatigue tester incorporates many design improvements. All of these new features are functional. They're intended to increase reliability, ease maintenance problems and simplify operation of the test unit. Experience indicates that the life expectation of this new tester is in excess of 1,000,000 tests. It accommodates wire specimens from 0.004-0.03 in. in diameter. And it provides a full range of reverse-bending stresses up to the yield point of the material undergoing test. Wire-loop guides prevent excessive vibration of the specimen during a test. (Hunter Spring Co.)



For more data write No. 107 on postcard, p. 247

Heavy-Duty Dragline

Elimination of friction clutches for all cyclic functions is a key feature of this new diesel-electric dragline and clamshell. Instead, static controls govern independent eddy-current clutches which regulate hoist and drag as well as the holding and closing motions. This system promotes high production and low maintenance. The new machine takes boom lengths of 100, 120 and 140 ft. It also embodies modern design and manufacturing techniques. For instance, oil pumps provide positive lubrication to the gears and bearings at all times.

Also, unitized construction eases assembly and assures correct line-up of shafts and bearings. To aid the operator, an elevated cab lets him see the work. (Bucyrus-Erie Co.)

For more data write No. 108 on postcard, p. 247

Plasma Gun

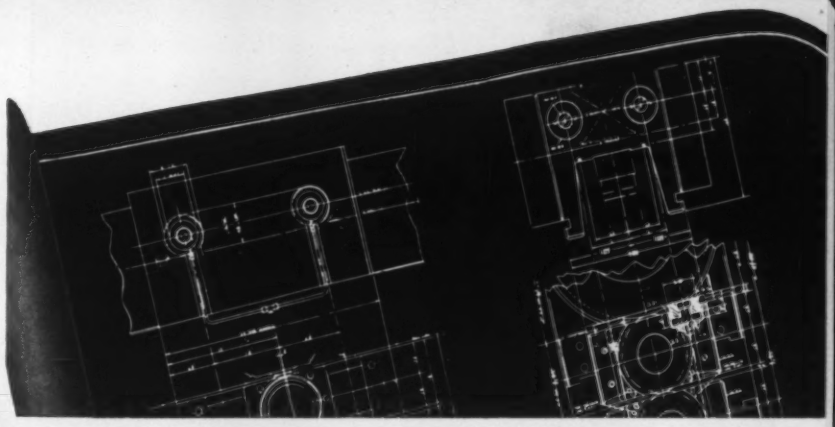
Weighing only 3½ lb, a compact plasma gun sprays refractory coat-

ings with a controlled thickness, density and bond strength. It can even deposit coatings on free-standing forms. The entire gun assembles with only 4 bolts. An electromechanical system with a vernier control regulates the powder feed. The complete spraying system includes the gun, a control console with self-contained powder feed and a power-supply and spray booth. (Avco Corp.)

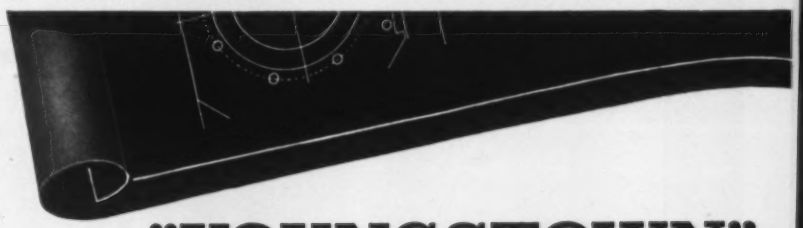
For more data write No. 109 on postcard, p. 247

Cuts Program Costs

Designed to speed up the writing of data-processing problems, a new computer-programming system puts the burden on the computer itself. Wherever possible, routine, clerical work is shifted from the manual programmer. Instead, the full speed and power of the computer is brought to bear on this tedious operation. Its manufacturer claims that use of the new system reduces the cost of preparing programs by as much as 50 pct. To do this, the programmer states his data processing problems in simplified symbolic code. Then the computer translates it into a more-difficult machine language. In certain operations, the new system also employs a magnetic-tape library of pre-checked



Blueprint of a new process



by "YOUNGSTOWN"

One of Many Major Developments for Industry during 75 YEARS of Service

Have you heard about Work Roll Shaping? It's a unique method for assuring uniform flatness of steel strip. Reports from users of installations already in operation indicate remarkable results. This is just one of the recent "Youngstown" developments which improve rolling mill operations. Complete information will be furnished, without obligation, on any of the following:

- *Hydraulic Work Roll Shape Control*
  Improves the quality of strip—economically
- *Automatic, Heavy Duty, Contour Roll Lathes*
  Modern design for templet or numerical control
- *New Carriage-Type Stretcher Levelers*
  Sizes from 10,000# to 4,000,000#. Fast, efficient
- *500 fpm—81" Sheet Scrubber Line*
  Cleans sheets up to 76" wide and .250" thick
- *New Rotary-Type Plate Scrap Chopper*
  Unique reciprocating design prolongs knife life
- *Coil Processors and Scale Breakers*
  New concept of coil processing and scale breaking

Other recent contracts range from complete turnkey installations to auxiliary components. Whatever the need—large or small—you benefit from "Youngstown" experience.

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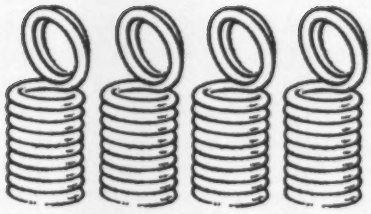
Youngstown 1, Ohio

The Porter Alloyist delivers the right alloy IN THE SPOTS THAT COUNT



In a split second, the parachute will leap from the pack, released by five special stainless steel springs. Can you think of a tougher spot for reliable performance? Now—and every other time—the springs must work *perfectly*, must keep their shape, unfailing strength and resistance to low temperatures. It's a job for exactly the *right alloy*—recommended and supplied by the Porter Alloyist.

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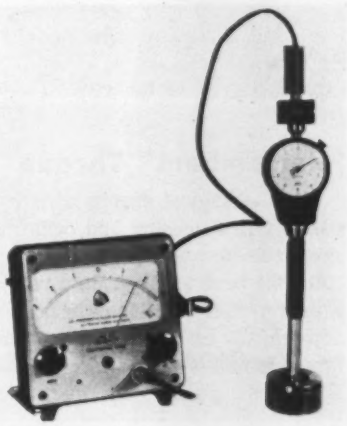
NEW EQUIPMENT

program segments. Desired segments are "called" from the library upon coded designation from the programmer. Use of the library saves a large amount of manual work. (Minneapolis-Honeywell Regulator Co.)

For more data write No. 110 on postcard, p. 247

Measuring Instrument

A new precision measuring instrument provides a simple, low-cost solution to industrial-gaging problems. Applications in which this new gage has found use include: Turning of forgings; boring-mill work; and lapping, honing and



jig-boring operations where holes must be constantly maintained within narrow limits. (Boice Gages, Inc.)

For more data write No. 111 on postcard, p. 247

Oxy-Fuel Gas Nozzles

Two-piece gouging nozzles, designed for use with natural gas and propane, satisfy a long-standing demand. They're ideal for gouging heavily-scaled or rusted plate. Castings with sand incrustations are also right up their alley. The new design incorporates a slotted-internal nozzle with an external sleeve. Slots provide a large number of individual small flames with high gas velocity. These flames combine to produce a high-intensity blast. Built-in stability prevents preheat flames from blowing off. Four-second gouging starts are not unusual with the new nozzles. (Linde Co., a div. of Union Carbide Corp.)

For more data write No. 112 on postcard, p. 247

Gages Tiny Holes

An all-new inspection machine measures a hole only 0.0001 in. in diameter for size, taper and bell-mouth. Just as important, it does this on a production basis. Its single-gaging stylus and electromagnetic sensing mechanism account for this remarkable capability. Where can you use it? Several expected applications include measuring holes and other types of cavities in precision parts, miniature bearings and missile and servo-valve components. The instrument is believed to be the first manufactured unit capable of checking holes this size. (The Sheffield Corp.)

For more data write No. 113 on postcard, p. 247

Welding Equipment

Featuring five voltage ranges with fine adjustments within each range, a constant-potential welder works on light plate, heavy structurals, and just about everything in between.

Standard equipment includes a voltmeter and an ammeter. (Miller Electric Mfg. Co.)

For more data write No. 114 on postcard, p. 247

Airless-Spray System

Fitting all 5-gal containers, a low-cost portable airless-spray system eliminates fog, overspray and material bounceback. This new system lets an operator apply a desired

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Cool Comfort for men who work in Hot Places

Available in 24", 30" and 36" sizes.

Your men can work better, faster and longer when air is re-circulated and cooled by these ruggedly built portable giant fans.

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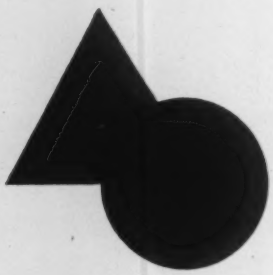

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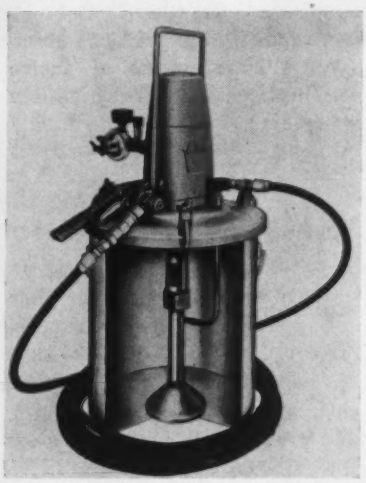
ATLAS STEELS

NEW EQUIPMENT

finish with pinpoint accuracy. A heavy-duty carrying handle pro-



vides easy portability. (The Aro Equipment Corp.)

For more data write No. 115 on postcard, p. 247

"Remembers" Torque

For mechanical checks of stress, strain, thrust, tension and compression, this new torque wrench records the peak reading. In a typical situation the receiving-inspection department of a firm purchasing fasteners makes periodic determinations of the maximum torque which a nut, bolt or screw will take before its elastic limit is reached and the fastener suddenly yields or snaps. Since the test operator does not have to think back to where the reading was, at the moment of yield, tests with the new wrench are fast and accurate. As torque is exerted, the memory indicator moves along a track on the face of the scale. It remains at the maximum reading. (P. A. Sturtevant Co.)

For more data write No. 116 on postcard, p. 247

Research Aid

Offering a common work coil and two frequencies, a new generator provides research personnel with a tool to investigate the effects of frequency on zone refining. Its common, single-turn work coil instantly switches from 300 kilocycles to 7 megacycles. A saturable reactor gives output control. The generator itself rates at 15 kw for continuous duty at either frequency. It will serve in practically any induction-heating process. Proper shielding and arrangement of parts has eliminated any interaction between the output circuits. (Induction Heating Corp.)

For more data write No. 117 on postcard, p. 247

Plasma Torch

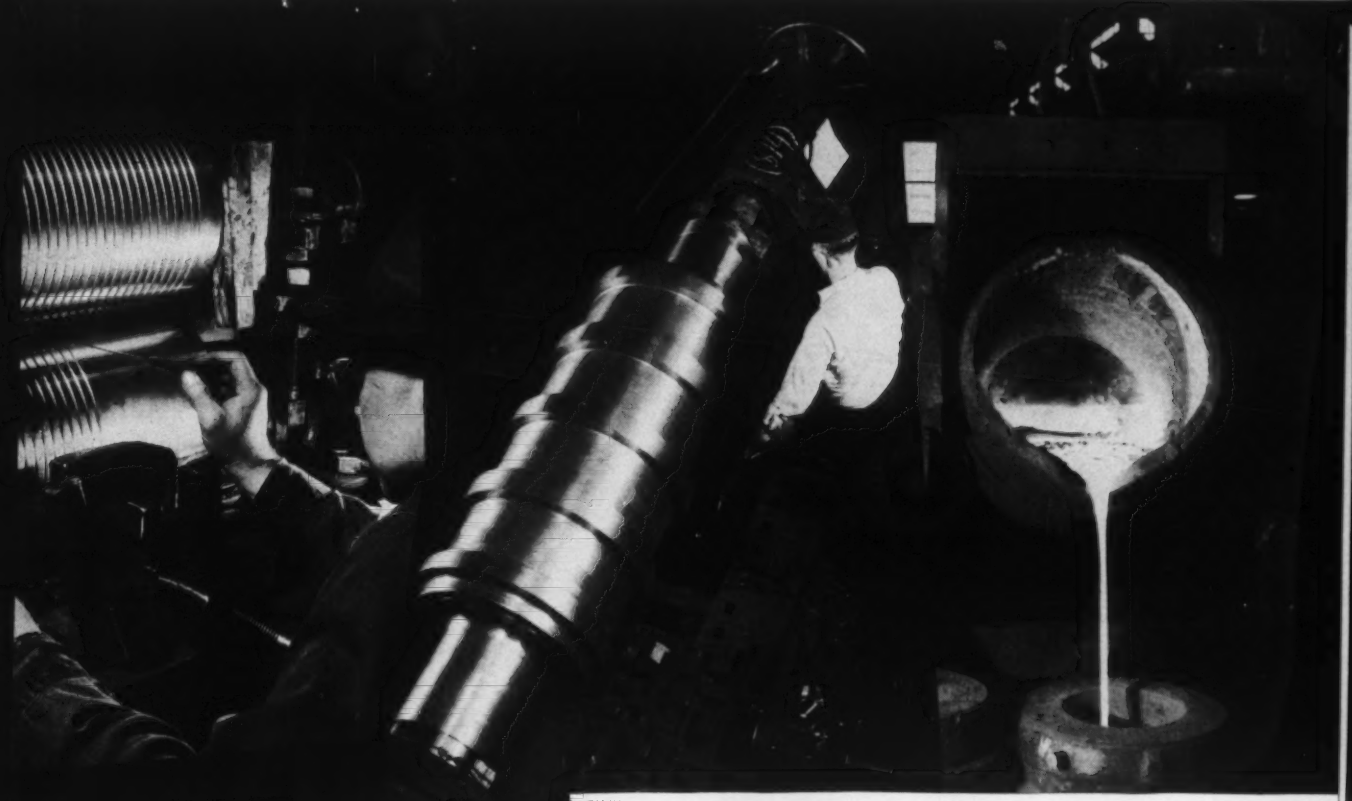
The manufacturer of a cutting torch claims it's capable of cutting conductive metals up to eight times faster than conventional oxy-acetylene devices. Based on the plasma-jet principle, this revolutionary torch uses a high-velocity 30,000°F plasma flame as the cutting medium. By operating at heats well beyond the upper limits of chemical fusion, the torch is able to cut with ease

high-melting-point metals such as tungsten, titanium, Monel, Inconel and stainless-steel alloys. The quality of the cuts is exceptionally high. (Plasmadyne Corp.)

For more data write No. 118 on postcard, p. 247

Sprays Refractories

Capable of spheroidizing refractory particles of 100-150 micron size with melting points in the 2100°-3200°C range, a new plasma-arc generator consists of four basic elements. These components include: A powder-feed device, an adjustable dual-electrode plasma torch, a quenching chamber and a gas-solids separator. In use, this plasma torch discharges a high-velocity refractory mixture through multiple jets of quenching gas. During the final-processing stage, the spheroidizing particles are separated



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For more than a century, our rollmakers have worked closely with the metal rolling industry to achieve greater standards of performance and quality.

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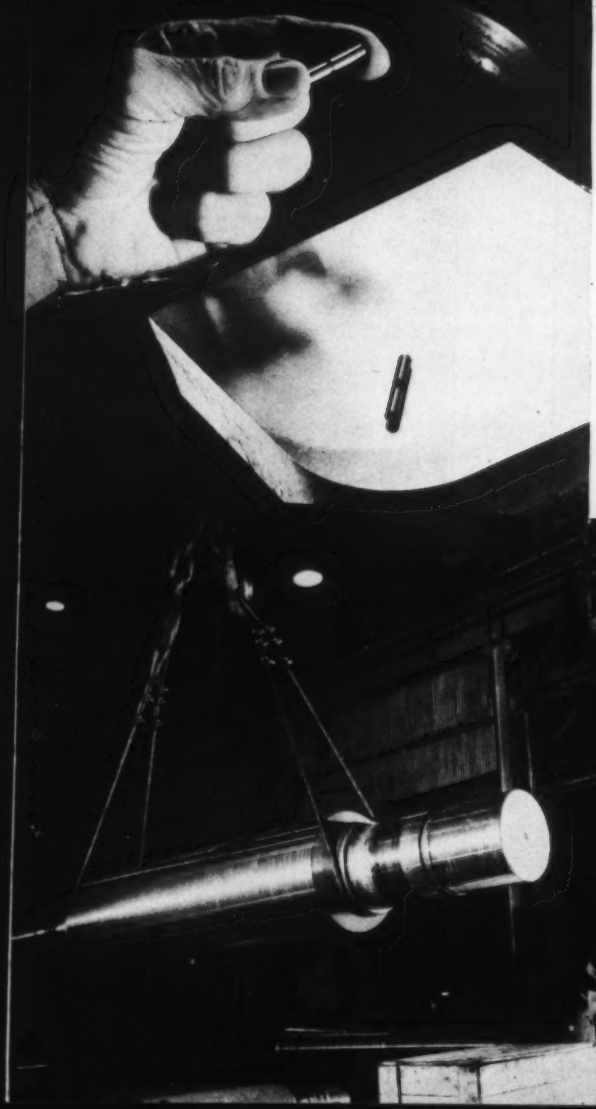
ROLLS



from the effluent gas by a standard cyclone separator. Output exceeds 10 lb of refractory powder per hour. (Plasmadyne Corp.)

For more data write No. 119 on postcard, p. 247

Paints Automatically

An automatic spray machine simultaneously paints a stripe on both sides of round parts, which can be rotated during finishing. White sidewall tires are a good example. Masking tape protection isn't needed during the painting cycle. In addition, the unit quickly and easily adjusts for various-size diameters. An automatic positioner accommodates variables in the parts, and a skip-spray device curtails painting when the part is out of position. Dubbed the "Spin Striper," the newcomer comes complete with all controls and a painting booth. (Conforming Matrix Corp.)

For more data write No. 120 on postcard, p. 247

Refractory Mixes

Available in 200-lb steel drums, two new high-alumina ramming mixes contain the minimum amount of water needed to insure optimum ramming workability. One of these new refractory mixes is known as Hi-Ram 70. It contains 70-pct alumina. Typical uses for this ramming mix include: Burner blocks, burner tunnels and firing cones, forge-furnace repairs, crucible-furnace linings, reverberatory furnaces, and ladles for gray and malleable iron. The other new ramming mix, Hi-Ram 90, contains 90-pct alumina. It's designed for use in rotary-hearth furnaces and forge-heating or re-heat furnaces. It can also serve in crucible covers, ladles and soaking pits. (Kaiser Refractories & Chemicals Div., Kaiser Aluminum & Chemical Corp.)

For more data write No. 121 on postcard, p. 247

Positions Gaging Unit

A new precision-measuring machine has a five-axis configuration which gages inside and outside contours accurately, rapidly and simultaneously. Electronic resolution is 0.000010 in. on each of four linear motions, and 0.36° on one rotary motion. Key to this accuracy is a special tape-control system. It furnishes electrical signals that position measuring probes to the specified dimensions. Two other probes measure deviation between these specified positions and the part being gaged. (The Bendix Corp.)

For more data write No. 122 on postcard, p. 247

Industrial Heaters

Unlike standard heaters, where burning occurs in a combustion chamber, a new industrial space heater has no combustion chamber. Instead, burning takes place in the air stream. Resultant gases enter the plant along with heated outside air. However these gases are less than 0.001 pct of the total volume —a generous safety margin. The heaters handle only non-recirculating make-up air, but they're particularly suited for industrial plants which generate noxious gases that are expelled by fans. (Dravo Corp.)

For more data write No. 123 on postcard, p. 247

Low-Cost Drill Press

With a 2-ft arm, this radial drill press fills the gap between expensive machine-tool units and light-duty machines. It's designed for use in general industry, job shops, construction, and trade schools. Special qualities that make the press ideal for all these fields are three-fold. First of all, the tool moves instead of the work. This saves time and labor. Secondly, capacity is well beyond that of an ordinary upright drill press. And finally, the newcomer is portable and easy to handle. (Rockwell Mfg. Co.)

For more data write No. 124 on postcard, p. 247

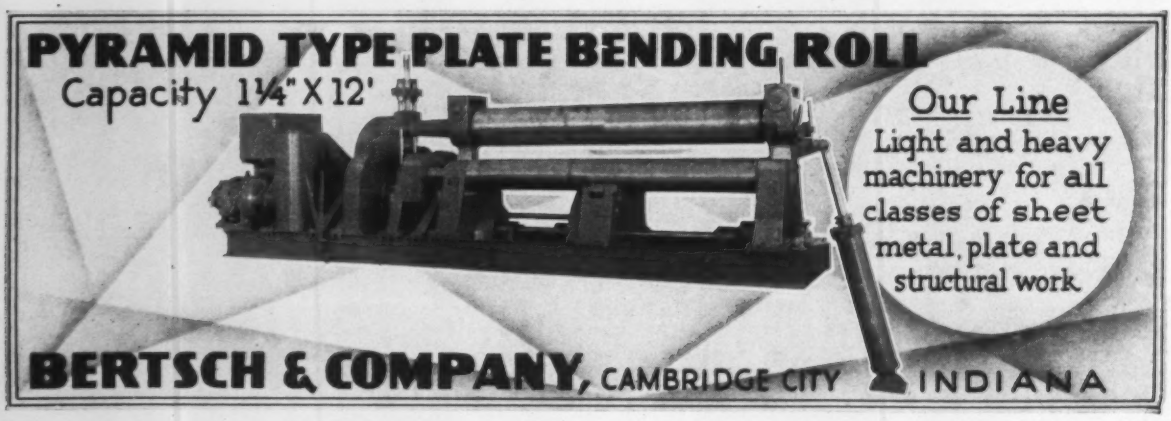
Heat-Sensitive Charts

Boasting a high degree of abrasion resistance, all-purpose heat-sensitive recording charts provide fine trace lines and outstanding dimensional stability. More than 15,000 different kinds of charts are stocked by this manufacturer. Accuracy of signal reproductions remain flawless, regardless of chart speed, heat range or type of recorder. (Graphic Controls Corp.)

For more data write No. 125 on postcard, p. 247

Machine-Tool Bed

By using its own tooling concepts, a machine-tool manufacturing com-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Capacity 1¼" X 12'
Our Line
Light and heavy machinery for all classes of sheet metal, plate and structural work
BERTSCH & COMPANY, CAMBRIDGE CITY INDIANA

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Here's why Burnside can speed things up like nobody else on the Mississippi.

The best location on the Mississippi: 30 miles south of Baton Rouge at Burnside, La., with the fastest and easiest access to low-cost inland transportation via barge.

Ultra-modern equipment, designed for ultra-efficient handling, includes: 2 gantry crane unloaders, 2 light ore buckets, 3 heavy ore buckets, 2 coal buckets, 1 ship/barge loader, ground storage area, conveyor system, all with maximum capacity. Average loading rate is 1200 tons per hour. Average unloading rate is 1000 tons per hour.

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A railroad siding, starting October 31. And adjacent to Burnside—2900 choice acres are available for extensive industrial development. For more information on how we can save you time and money, write to:

Ramsay, Scarlett & Co., Inc., Burnside Terminal, Burnside, Louisiana.

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HIGHER STRENGTH and BETTER WELDABILITY...

J.S.W.'S "WELCON" Series High Strength Steel Plates will serve with highly satisfactory results in fabricating welded structures.

4 Features in One

High Strength and Weight Reduction

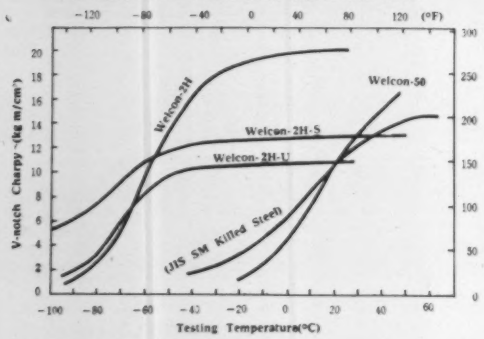
Superior Notch Toughness at Low Temperature

Excellent Weldability

Atmospheric Resistance

About 600 years old Japanese wooden sculpture, named "Rāga-jāga" in Sanskrit

Comparison of V-notch Charpy Impact Test Curve



Mechanical Properties

Grades	Yield point (psi)	Tensile strength (psi)
Welcon-50	min 47,000	71,000- 82,000
Welcon-2H	min 65,000	82,000-100,000
Welcon-2H-S	min 90,000	100,000-114,000
Welcon-2H-U	min 100,000	114,000-135,000

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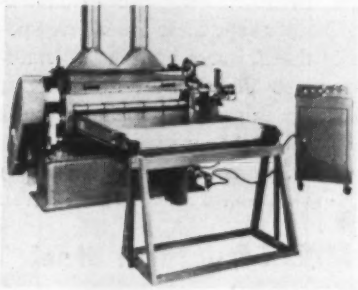
pany reduced handscraping on a 24-ft, 38,000-lb cast-iron machine bed by about 50 pct. Combining all elements for machining also cut production time some 60 pct. The bed, for a new line of 5-in. milling machines, winds up flat within tenths. Basic accuracy is 0.0001 in. per ft for straightness and surface alignment. However, hand scraping is still necessary to provide oil pockets on the bedway surfaces. (DeVlieg Machine Co.)

For more data write No. 126 on postcard, p. 247

Finishes Surfaces

For coil or sheet in any lengths, a new finishing machine supplies coverage in a single pass. Accord-

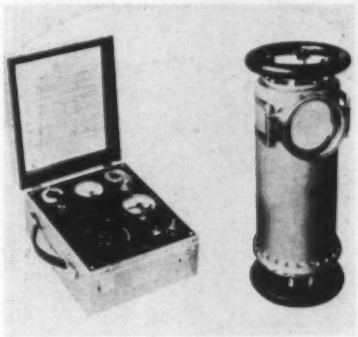


ing to the manufacturer, service tests have established its efficiency for either off-line or automatic in-line operation. Roughing, polishing, buffing and satin finishing are just a few of the many operations the new machine takes in its stride. In the interest of versatility, it's available with over 30 options. (The Clair Mfg. Co., Inc.)

For more data write No. 127 on postcard, p. 247

X-Ray Tester

Operable by one man, an industrial X-ray unit provides low-cost inspection for metals ranging from wafer-thin magnesium to thick steel plate. Two models are available. The first is equipped with a wide-angle, 60° X-ray tube for directional-beam radiography. A 369° tube suits the second model for circumferential radiography, and for quick adaptation to single-beam inspection through the use of optional adapters. Both models can be applied effectively on pipeline, pressure vessels, furnaces, castings and for many other inspection tasks in

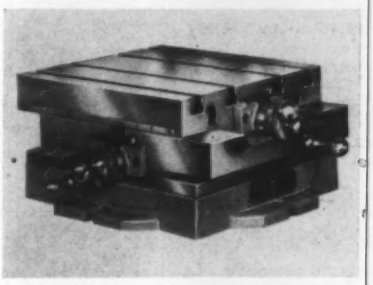


the metalworking industry. (Westinghouse Electric Corp.)

For more data write No. 128 on postcard, p. 247

Auxiliary Table

A new model cross-slide table provides precision positioning on the X and Y axis. It can also be used in conjunction with standard rotary tables to obtain X, Y and rotary motion. The new model's 12 x 12-in. working surface affords 10 in. of travel on each slide. Hardened and ground Acme feed screws mount on tapered-roller bearings and run in bronze nuts that are adjustable. Accuracy is within 0.001 in. in the full 10-in. cross-slide travel. Other features include



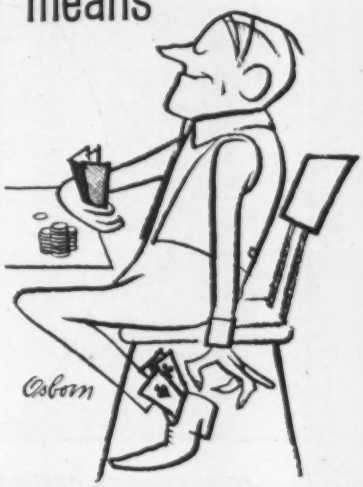
tapered gibs, adjustable quick-set dials and stainless-steel scales. Dials are graduated in 0.001-in. increments; scales in 0.100-in. increments. (Troyke Mfg. Co.)

For more data write No. 129 on postcard, p. 247

Frequency Multiplier

A new induction power source uses a static frequency-multiplying circuit that converts a balanced 3-phase, 60-cycle power input to a 780-cycle output. Known as the Inductro TRI-LINE, this new multiplier fills the gap between conven-

Capacability means



Convenience

When it comes to ramming refractories, *convenience* is Basic. And, it pays to let Basic's magnesia ramming refractories, RAMSET and RAMICLASE, be your "ace in the hole" when schedules are tight. For quick, dependable bottom installations, they can't be beat.

In the 20 years since their introduction, RAMSET and RAMICLASE have become the standard of comparison for open hearth and electric furnace bottoms. For the best possible job, Basic furnishes special mixers, conveyors, rammers and other equipment to speed installation and reduce labor costs.

If you use basic refractories, you can depend on Basic's *capacity* and *ability*. Write for 24-page booklet outlining application of Basic's more than thirty dead-burned dolomites, ramming and gunning refractories, patching materials and tar-bonded linings for basic oxygen furnaces.

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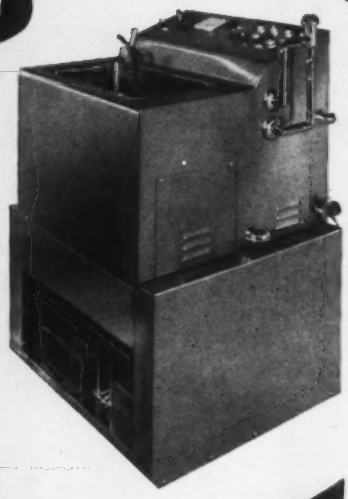
CLEVELAND 15, OHIO

CLEANING *Specialists*
FOR AMERICAN INDUSTRY



SOUND WAVES GET PRECISION PARTS CLEANER, FASTER

When Detrex developed Soniclean® (ultrasonic metal cleaning) it provided manufacturers of missiles and other precision products with an amazingly efficient new cleaning process.

In Soniclean equipment either aqueous or chemical solutions are agitated by high-frequency sound waves—penetrating apertures and passages which were difficult or impossible to adequately clean with previous methods.

Soniclean is only one of many Detrex advancements that has brought new production efficiency and manufacturing economy to American industry.

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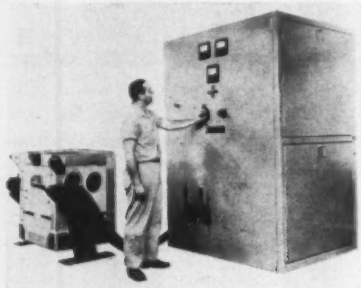
Spray Booth Compounds
Industrial Washers

tional, high-frequency, motor-generator units and 60-cycle, line-frequency induction power sources. For large-melting, as well as sinter-

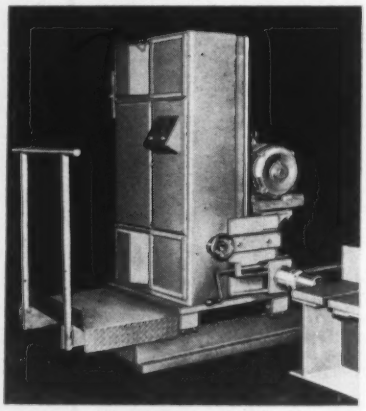


ing, hot-pressing, graphitizing, and billet-heating jobs, the 180-cycle power offers lower installation and upkeep costs as well as improved performance. In place of motor-generator sets, these units have special transformers in a conveniently-operated circuit. Overloads can't damage this circuit. Output ranges from 125 kilowatts to more than 700 kilowatts. (Inductotherm Corp.)

For more data write No. 130 on postcard, p. 247

Mills Structural Steel

Small and compact, a new vertical-milling machine weighs only 4000 lb, stands just 72-in. high, and measures a mere 96-in. overall in its standard length. It's low in cost



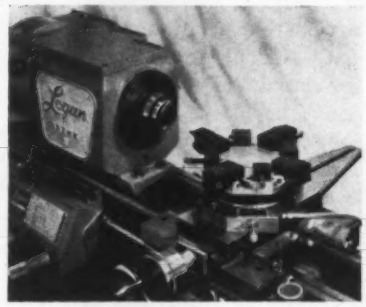
and specifically for milling columns, chords, beams and other structural shapes. A 15-hp spindle provides ample power for these structural milling applications. Standard spindle speed is 1200 rpm; however, you can change this speed with belt and pulley adjustments. All move-

ments are controlled from a convenient pushbutton panel. (Futurmill, Inc.)

For more data write No. 131 on postcard, p. 247

Turret Heads

This new eight-station turret head can convert any make or size of standard-engine lathe into a versatile chucking machine. The heads cut machining time, simplify difficult jobs, and speed up tooling. To do this, the vibration turret head replaces the entire lathe compound. This eliminates the tailstock. Rigid-tool mounting and repeat indexing within 50 millionths of an inch are



other benefits. For long life, all moving parts are hardened, ground and chrome plated. (Logan Engineering Co.)

For more data write No. 132 on postcard, p. 247

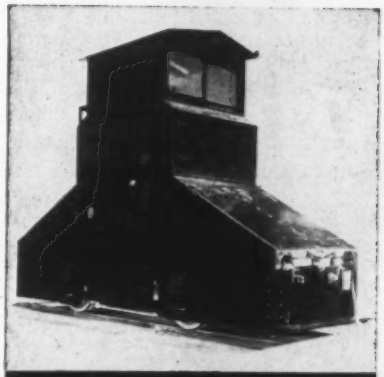
Mass-Production Dryer

Designed especially for mass-production use in the plating industry, this small, rotary-drum machine dries small parts in bulk form after plating. It's gas heated with hot-air recirculation for maximum economy. Also, fire-box heating and blower assemblies are located under the 24-in. drum where they're out of the way. On delivery, the machine is completely assembled and wired, ready for connection to services. (The Alvey-Ferguson Co.)

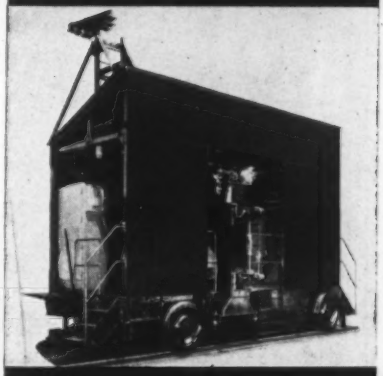
For more data write No. 133 on postcard, p. 247

Thread-Rolling Heads

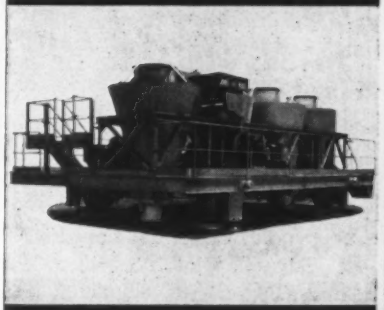
A new 2-in. thread-rolling head is designed to roll diameters from 1¼-2 in. UNF and UNC (right and left hand). Available in both stationary and revolving models, the new unit increases a line of these items to five sizes covering a di-



QUENCHER LOCOMOTIVE



DOOR MACHINE



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O.D.	I.D.	O.D.	I.D.	O.D.	I.D.
2½	x 2	4	x 2	4½	x 3½
2¾	x 2		x 2¼		x 3¾
	x 2¼		x 2½		x 4
3	x 2		x 2¾	4¾	x 2¼
	x 2¼		x 3		x 2½
	x 2½		x 3¼		x 2¾
3¼	x 2		x 3½		x 3
	x 2¼	4¼	x 2		x 3¼
	x 2½		x 2¼		x 3½
	x 2¾		x 2½		x 3¾
3½	x 2		x 2¾		x 4
	x 2¼		x 3		x 4¼
	x 2½		x 3¼	5	x 2½
	x 2¾		x 3½		x 2¾
	x 3		x 3¾		x 3
3¾	x 2	4½	x 2		x 3¼
	x 2¼		x 2¼		x 3½
	x 2½		x 2½		x 3¾
	x 2¾		x 2¾		x 4
	x 3		x 3		x 4¼
	x 3¼		x 3¼		x 4½

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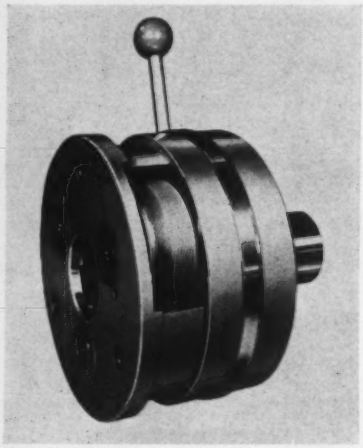
NEW EQUIPMENT

ametrical range from ¼-2 in. The revolving model applies to threading machines and automatic-screw units which employ a rotating tool. The stationary head suits turret



lathes, hand-screw and automatic-screw machines which rotate the work rather than the tool. Both styles are self-opening in operation. (Landis Machine Co.)

For more data write No. 134 on postcard, p. 247

Speeds Plate Cutting

This new plate-cutting machine handles both ferrous and non-ferrous metals. When it's set up to cut non-ferrous, the cutting head is locked in position. Then, at variable speed, its carbide-tipped wheel traverses the width of the bed. The machine cuts 4-in. aluminum plate at 4 fpm, or even faster rates. For ferrous or steel alloys, the head is unlocked. This lets the oscillating abrasive wheel sense its way through the cut. Cutting rate is as high as three seconds per sq in. (Wallace Supplies Mfg. Co.)

For more data write No. 135 on postcard, p. 247

Drills, Reams and Taps

An automatic indexing machine drills, chamfers, reams and taps forged-steel ells and tees in nominal pipe sizes of ⅜, ½, ¾ and 1 in. Using two spindles, and machining two pieces at a time, the machine performs the following operations: 1. Subland drills (high speed), 2. Reams—to locate accuracy of hole alignment, and 3. Taps—using special Scully-Jones adjustable, floating tap holders. Production capacity of ⅜-in. tees and ells is 200 per hour. Line hold accuracy is ±0.005 in. (Swift Ohio Corp.)

For more data write No. 136 on postcard, p. 247

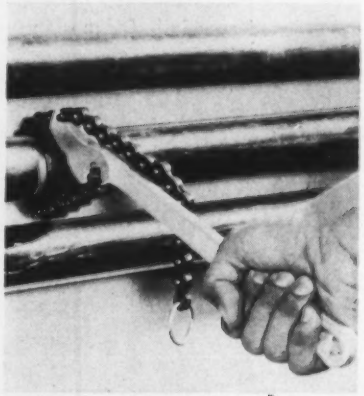
Speeds Setups

Among the advantages claimed for a new step block are a 50 pct decrease in setup time plus uniform heights and quick adjustment. Typical uses are holding fixtures for high-speed tapping or grinding on a drill press or surface grinder. The blocks are made of cold-rolled steel that's zinc plated to prevent rust. Solvents and oils cause no deterioration. The blocks are a convenient and compact device for the machinist who demands dependable leveling. (HEF Co.)

For more data write No. 137 on postcard, p. 247

Utility Chain Wrench

Designed to take ⅛-4 in. pipe, a new-size utility chain wrench features ratchet-like action in either direction. Double-jaw construction permits operation in either direction without removing and refastening



the wrench. And only ¾-in. clearance is required to fit the wrench on. Thus it particularly suits limited-access applications. Handle and jaw are nickel-chrome plated. Length of the chain is 15¾ in.; however, extra links may be added if desired. (Ridge Tool Co.)

For more data write No. 138 on postcard, p. 247

continued on p. 250

THIS CINCINNATI®
shears heavy plate

Paragon Bridge & Steel Co., Novi, Mich., cuts costs as it cuts heavy plate with this Cincinnati Shear:

Operators cut production time with rapid, easy gaging and adjustment; no need for changing knife clearance to cut different thicknesses of metal.

The Cincinnati Shear also permits square shearing, notching, and slitting operations.

This machine can trim an edge to one-half the thickness of a sheet or plate. Furthermore, longer knife life is obtained from extra-size, four-edge knives.

Whether you're considering a mechanical or hydraulic shear, the broad Cincinnati line offers you maximum advantages for your plate shearing requirements. Write for your copy of a Cincinnati Shear catalog.

Shapers / Shears / Press Brakes

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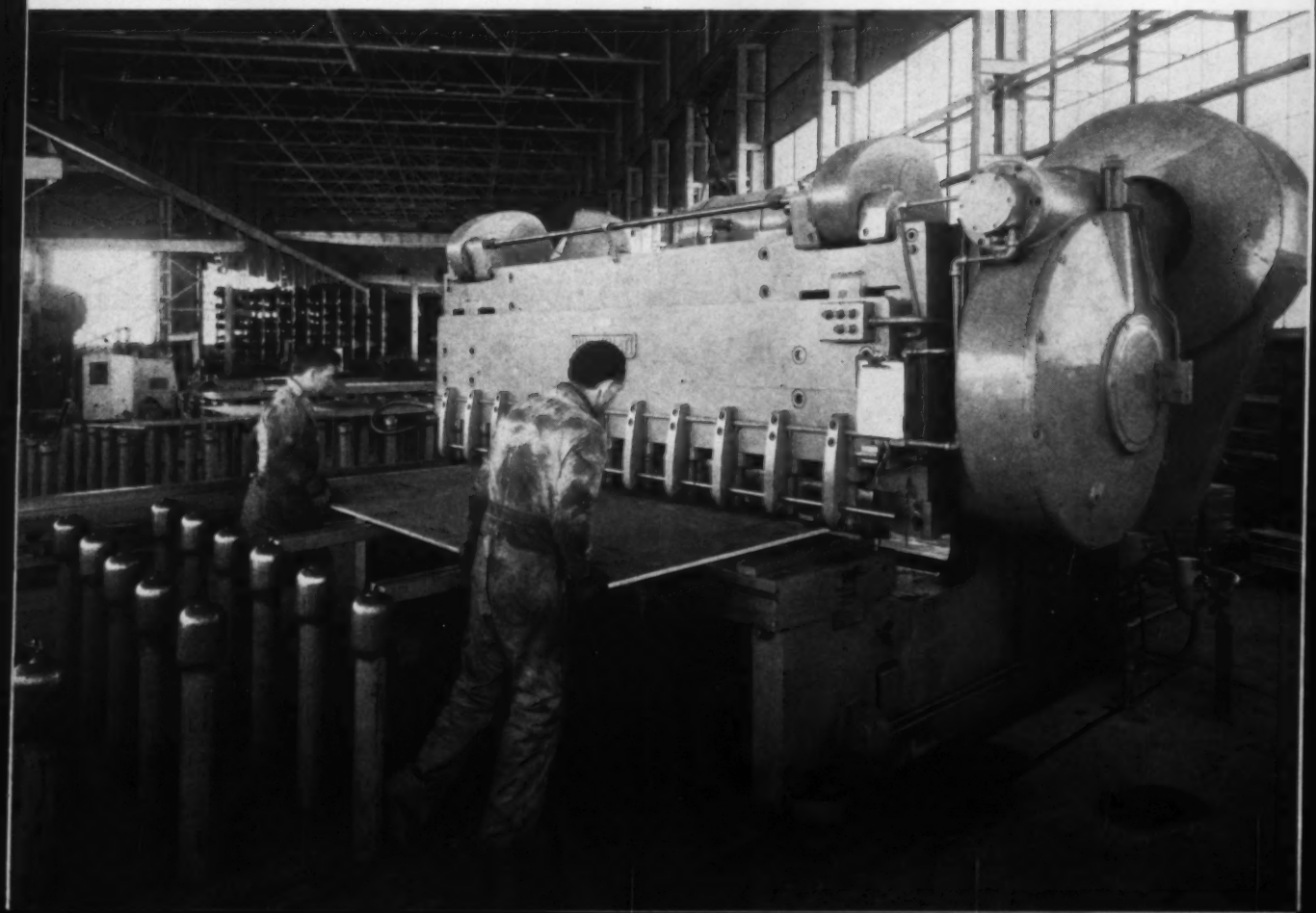
Courtesy Paragon Bridge & Steel Co., Novi, Mich.



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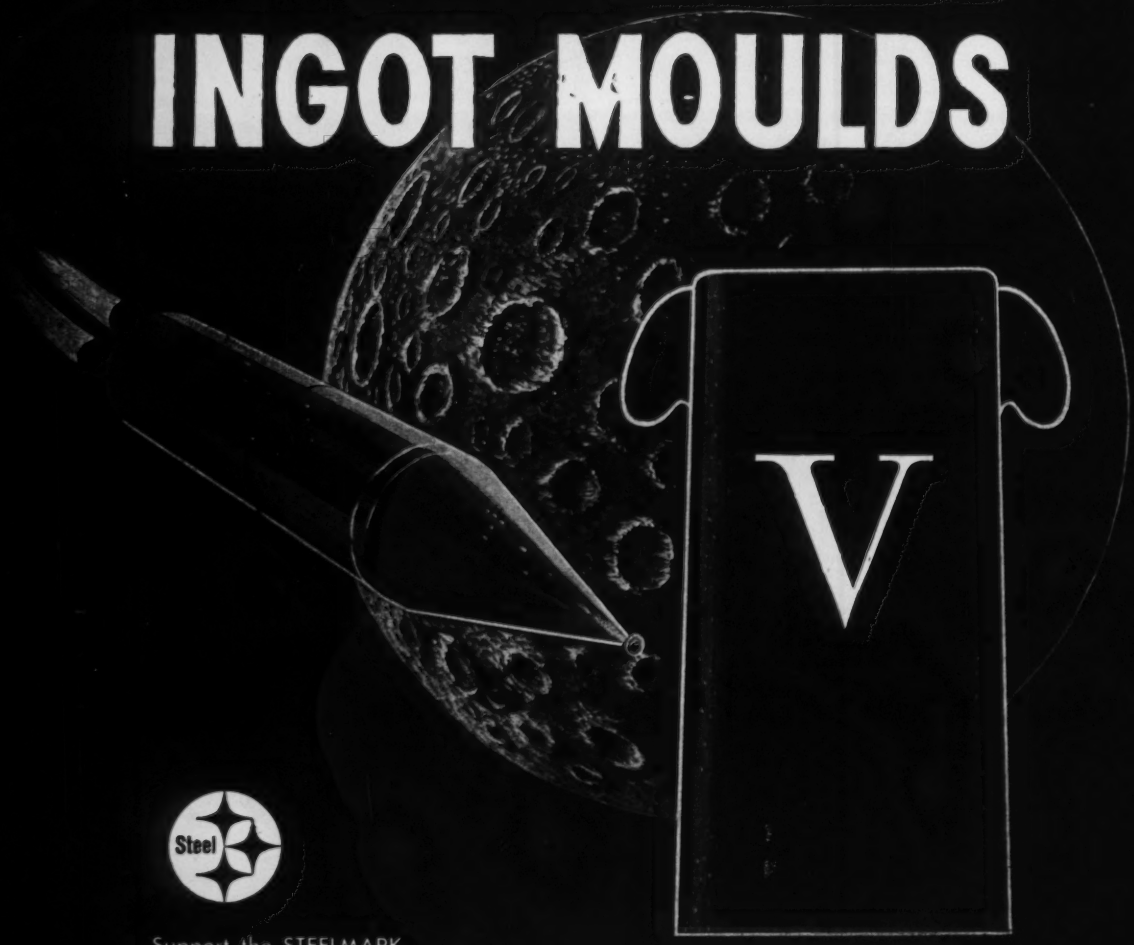

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Data-Recording System

In its comprehensive eight pages, this four-color brochure describes modular digital-data systems for alarm scanning and digital recording of analog values. It discusses system-design features, applications, and illustrates a wide variety of standard field-proven building blocks and subassemblies. (Monitor Systems, Inc., a subsidiary of Epsco, Inc.)

For free copy circle No. 1 on postcard

Centrifugal Enameler

This brochure describes a new development in the application of paint, enamel and other coatings to small parts. It's an air-powered machine that can safely handle highly-volatile coatings. In addition, the enameling unit provides full control of film thickness. (The Leon J. Barrett Co.)

For free copy circle No. 2 on postcard

Aid for Purchasers

Recently compiled is a conversion chart which lists identical jig and fixture components manufactured by different companies. Prepared as an aid for purchasing men, it helps them bulk their orders for components parts and avoid purchasing small quantities from different companies. (Northwestern Tools, Inc.)

For free copy circle No. 3 on postcard

Welding News

Industrial exhaust fans, constructed of corrosion-resistant alloys and fabricated with bronze welding electrodes, are described in the most-recent issue of the Ampco Welding News. The results of recent tests on welding of aluminum-brass tubes to aluminum-bronze tube sheets are also explained. (Ampco Metal, Inc.)

For free copy circle No. 4 on postcard

Helpful Gage Hints

Steps for the proper care and inspection of horizontal and vertical dial indicators are pointed out in a new bulletin prepared especially for inspectors and quality-control men. Among the helpful hints are step-by-step procedures for trouble shooting. (Dwight Instrument Co.)

For free copy circle No. 5 on postcard

Two-Stage Pumps

Information on two new sizes in a line of centrifugal pumps comes your way in an illustrated technical bulletin. Performance curves, material specs, interchangeability charts and dimensions give complete coverage. (Goulds Pumps, Inc.)

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Shocking Test

Announcing a new line of standard shock-test machines, a series of data sheets points out that these units combine the simplicity of drop testers with versatility of pneumatically-driven testers. (Monterey Research Laboratory, Inc.)

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Centrifugal Pumps

This new eight-page bulletin illustrates and describes a complete line of single-stage, double-suction, horizontal split-case pumps. (Aurora Pump Div., The New York Air Brake Co.)

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51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90

If you want more details on products advertised in this issue fill in below:

Page .....Product .....

Page .....Product .....

Page .....Product .....

INVALID WITHOUT COMPANY NAME AND TITLE
PLEASE TYPE OR PRINT

Name .....

Title .....

Product Manufactured .....

Company .....

Co. Address .....

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City ..... Zone .... State .....

FREE LITERATURE

chure also lists components, special products and services. The manufacturer points out that materials handling frequently represents the biggest item in a given company's total-production expense. By the same token it often provides the best opportunity to cut costs and boost profits. (Webster Mfg., Inc.)

For free copy circle No. 9 on postcard

Office Equipment

New subjects covered in the 1961-62 Reference Manual for Steel Equipment include book shelving, sorting files, drawer cabinets and office-storage units. Its 64 pages also include a range of storage equipment shown in previous issues. (EQUIPTO)

For free copy circle No. 10 on postcard

Vacuum Evaporator

Catalog Sheet C-2 describes a new automatic-valving vacuum evaporator. Included is a block diagram of the complete system; a chart illustrating the valve positions at various stages of operation; and a performance graph showing the unit's vacuum capabilities. (MIKROS, Inc., a subsidiary of Electro Scientific Industries)

For free copy circle No. 11 on postcard

Latest Braid Uses

New applications, standard terminology and types of tubular and flat-metal braid constructions are described and illustrated in a new brochure. It's slanted for designers and engineers who deal with formulas designating construction, braid angle, pitch, percent of coverage and picks per inch. (Dept. RDT, National-Standard Co.)

For free copy circle No. 12 on postcard

Precision Shafts

Available on request is a general catalog showing a new line of miniature precision shafting. Lengths range from 1-24 in., with a 10-microinch finish. (Northfield Precision Instrument Corp.)

For free copy circle No. 13 on postcard

Universal Ironworker

Sheet-metal or steel-fabricating plants will want to know about the advantages of a versatile ironworking machine. All the details on an all-purpose unit are included in an attractive brochure. The machine itself features three separate clutches and slides which enable three men to work independently at the same time. (E. G. Heller's Son, Inc.)

For free copy circle No. 14 on postcard

Variable-Speed Belts

Wood's Bulletin 24103, "Variable-Speed Belts," includes 14 pages of valuable information for those contemplating belt replacement. It lists all known manufacturers of equipment using variable-speed belts, along with the belt number and Wood's comparable number. (T. B. Wood's Son, Co.)

For free copy circle No. 15 on postcard

Magnetic Inspection

Wet magnetic-particle inspection is the subject of a new pocket-size booklet. It describes a compound which mixes with water to provide the vehicle for oil-soluble and water-soluble inspection pastes. Since kerosene and solvents aren't used, fire and toxic hazards are greatly diminished. (Harry Miller Corp.)

For free copy circle No. 16 on postcard

Cutting Tools

Here's a completely-new catalog that outlines an entire line of end-mill and die-sinking cutters. Informative data and numerical charts aid the metalworking engineer in his cutting problems. (The Tomkings-Johnson Co.)

For free copy circle No. 17 on postcard

Ball-Valve Brochure

A new four-page brochure deals with the Econ-o-miser line of ball valves. It aids users in the selection of correct sizes and combinations of metals, seals, seats and pipe ends. (Worcester Valve Co., Inc.)

For free copy circle No. 18 on postcard

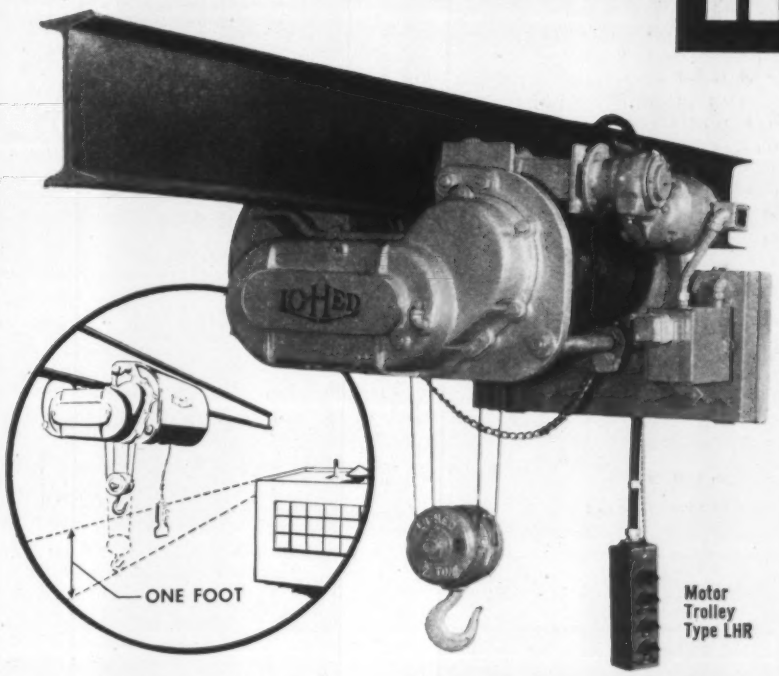
Complete Lubrication

This 36-page catalog outlines new lubrication systems. It covers direct, single-line, dual-line, oil-circulating and constant-pressure setups. (Research Appliance Co., Lubrication Div.)

For free copy circle No. 19 on postcard

LOW HEADROOM MEANS E-X-T-R-A WORKROOM

AE® LO-HED HOISTS



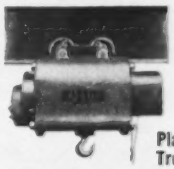
and no other hoist gives as much workroom as LO-HED.

The extra workroom you get from a LO-HED hoist is like money in the bank. In new building construction you'll realize sizeable savings in a foot or more of construction height. In your present plant you'll have extra workroom for speedier and easier handling of materials. All this is accomplished with LO-HED's exclusive balanced-around-the-I-beam design, which eliminates bulky arrangements that waste horizontal work area.

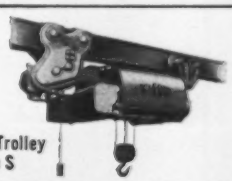
And that's only half the story. Other LO-HED advantages include precision engineering and rugged construction to cut costly downtime; 100% positive automatic stop; powerful automatic holding brake; a fully enclosed, heavy-duty, ball bearing motor especially built for heavy hoist duty. And most importantly, the longer working life at lower cost makes LO-HED hoists first in long-range economy.

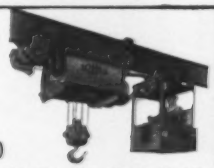
HAVE A HOIST PROBLEM?
Let our engineers analyze your needs and custom plan the proper hoist.

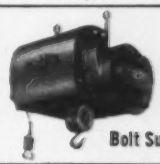
Complete Line of HOISTS and CAR PULLERS for Efficient Materials Handling

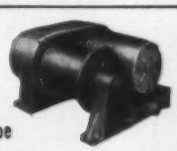

Plain Trolley Type

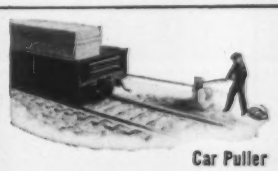
Hand-Geared Trolley Type


Motor Trolley Type S


(Indoor) Motor Trolley, Cab-Controlled Type


Bolt Suspension Type


Stationary Type


Car Puller

AE INDUSTRIAL DIVISION
AIRCRAFT ARMAMENTS, INC. Post Office Box 6853, Baltimore 4, Md.
CLEVELAND DISTRICT: A. E. Company, 1157 Leader Building, Cleveland 14, Ohio
NEW YORK DISTRICT: AE Industrial Division, 1 Exchange Place, Jersey City 2, N. J.

NEW... ALL NEW... FROM

KALAMAZOO

The "BIG K"

Now, after more than four years' research, Kalamazoo brings to you the all new Model 14A — horizontal metal cutting bandsaw. Incorporating some 30 shop proven, cost saving features, this hydraulic driven, heavy duty bandsaw offers cutting capacity and ability in excess of any cut-off method, at far less tool cost per square inch of cutting.

Most important among these profit producing features are: positive control force feed; clockwise blade rotation to reduce teeth shock — increase blade life; convenient 36" machine height to reduce operator fatigue; large 14" x 24" capacity; push button control; dual movable vise jaws; adjustable blade tension.

For complete details on this amazing new machine tool, phone, write or wire your Kalamazoo representative. Facilities for test runs of your material on the "Big K" are at your disposal — at no obligation.

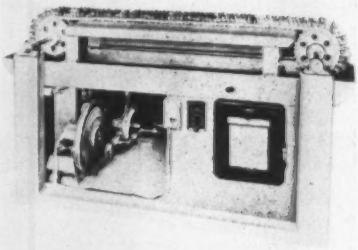
MACHINE TOOL DIVISION
Kalamazoo Tank & Silo Company

508 Harrison St.
Kalamazoo, Mich.

NEW EQUIPMENT

Slot-Heating Furnace

A continuous, gas-fired slot-heating furnace features adjustable sprockets and chains which move in or out of the unit depending on



the length of the rods undergoing heating. This furnace is used for heating one end of steel rods prior to upsetting on a forging press. All rods move through the furnace by means of a notched chain. The chain itself serves as a conveyor. Cooling is accomplished in a water trough that runs the full length of the furnace under the sprockets. (Waltz Furnace Co.)

For more data write No. 200 on postcard, p. 247

Yields Hard Facing

Electric-arc application of tungsten-carbide facings can be improved by using a new solid-core rod. Called the Kenface Arc Rod KT-200, the newcomer is recommended for large pieces on which

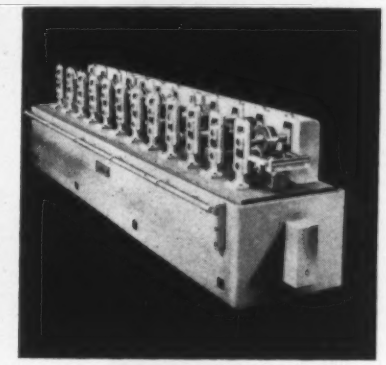
gas application isn't practical. The new rod is composed of a solid tungsten-carbide core surrounded by

a steel sheath with a coating which permits depositing a hard surface as smooth as that applied by a mild-steel welding rod. The deposit flows with an extremely low porosity and minimum heat checking. The manufacturer says the new rod is suitable for either bead or wash-pass application. Hardness of the deposits ranges from 58-63 Rc. All rods measure 3/16-in. diam x 14-in. long. Coverage of ⅛-in. thickness is 25 sq in. per pound of rod. (Kennametal Inc.)

For more data write No. 201 on postcard, p. 247

Form-Rolling Machines

Three types of form-rolling machines are available in a new line. One machine is intended primarily for use in roll-forming small shapes. A heavier model proves suitable for wider flat shapes and moderate-



sized structural members. The third model accommodates deeper shapes such as those used in carports, roof panels, etc. (Met-L-Rol Corp.)

For more data write No. 202 on postcard, p. 247

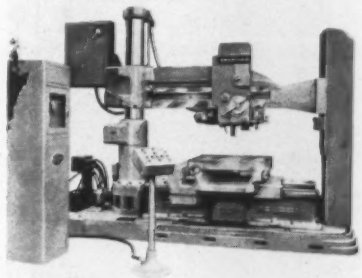
Defeats Chatter

According to a broaching-machine manufacturer, the ideal condition in pull-up broaching has now been achieved. In a new machine, matched-ball screws pull the broach. Because these twin screws line up directly with the broach, it's said that chatter is out of the picture. As a result, surface finish is greatly improved. Major effect of the new method is that it eliminates bending forces and losses in the slide caused by the cantilever beam effect of driving the slide itself. Instead, this method transmits power directly from the gear box through ball screws to the broach. Thus, the only function of the machine ways and slide is to guide and stabilize the broach. (Lapointe Machine Tool Co.)

For more data write No. 203 on postcard, p. 247

Boring and Drilling

Ultra-precision is insured in a new tape-controlled boring and

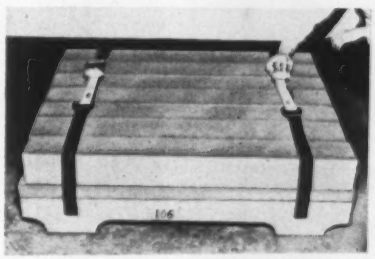


drilling machine. After dials are manually set, controls on the unit automatically traverse the spindle to the workpiece. These controls feed the spindle to a preset depth. Then it automatically traverses back to its starting point. This cycle continues until a tool change becomes necessary. Tapes control the automatic spindle cycle after initial setups are made. Twelve power feeds give from 0.001-0.025 ipm. The positioning table travels 30 in. on each axis. Tapes permit positioning accuracy to ±0.00025 in., with repeatability of ±0.00050 in. (The American Tool Works Co.)

For more data write No. 204 on postcard, p. 247

Metal-Mesh Strapping

Easy to rig and unhitch, a new metal strapping material offers many advantages. Most important of these



is the fact that it can be used over and over again. Essentially, the assembly consists of a pair of metal-mesh strapsections, with plate at-

Capacability means

Osborn

Dependability

When it comes to furnace maintenance refractories, *dependability* is Basic. You won't need the "Alpine Rescue Squad" if you rely on Basic's dead-burned dolomites, MAGNEFER and SYNDOLAG. For more than 40 years steelmakers have known these products as the standard of comparison for heat-to-heat furnace repair.

MAGNEFER and SYNDOLAG provide better bonding, greater density and higher heat resistance. Used in virtually every open hearth and electric steelmaking shop in the country, MAGNEFER and SYNDOLAG give you more advantages, more for each of your refractory dollars.

If you use basic refractories, you can depend on Basic's *capacity* and *ability*. Write for 24-page booklet outlining application of Basic's more than thirty dead-burned dolomites, ramming and gunning refractories, patching materials and tar-bonded linings for basic oxygen furnaces.

BASIC INCORPORATED

845 HANNA BUILDING
CLEVELAND 15, OHIO

tachments at one end for permanent bolting to a pallet. At one of the free ends, there's a handle with a piece of nylon strapping attached. To bind material in place on the pallet, the nylon is inserted into the ratchet tightening buckle. Then tension is applied by simply moving the tightening-buckle handle back and forth. In this manner, it's possible to apply as much as 1000-lb tension to the assembly. (The Cambridge Wire Cloth Co.)

For more data write No. 205 on postcard, p. 247

Secretary Saver

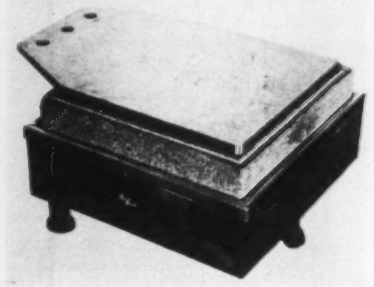
This side-opening, ball-bearing drawer file takes the place of ordinary drawer-file cabinets, as well as shelf files. Two clerks have simultaneous access to material in one cabinet. For fast, random, in-and-out filing, all levels may be used as open-shelf files. However, for volume or concentrated work, you can pull out the drawer and "drop file."

Cost is surprisingly low. (Wheeldex & Simpla Products, Inc.)

For more data write No. 206 on postcard, p. 247

Vibration Testing

Available in four models, a new series of horizontal vibration-test fixtures boasts maximum usable frequencies from 1200-2000 cps. Each of these test fixtures consists

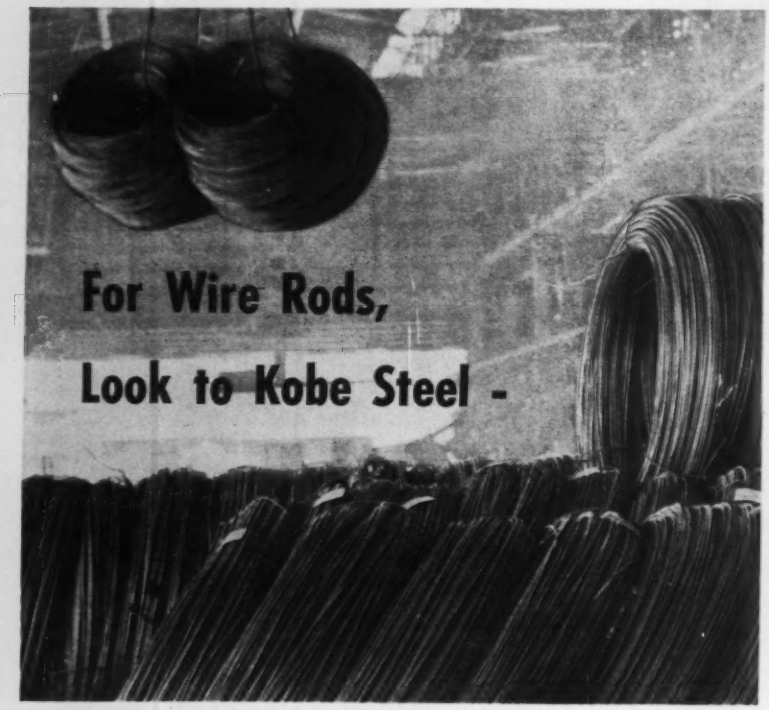


of a magnesium specimen table. This table slides on a polished granite block. Sliding friction is reduced by an oil-air film. A standard vibration exciter drives the table. During a test, bolts secure the test specimen to the table. (MB Electronics, a div. of Textron Electronics, Inc.)

For more data write No. 207 on postcard, p. 247

Gages Coatings

In addition to gaging non-conductive coatings on nonferrous base metals such as aluminum and copper, a new nondestructive testing device can be used for other gaging applications. These applications in-

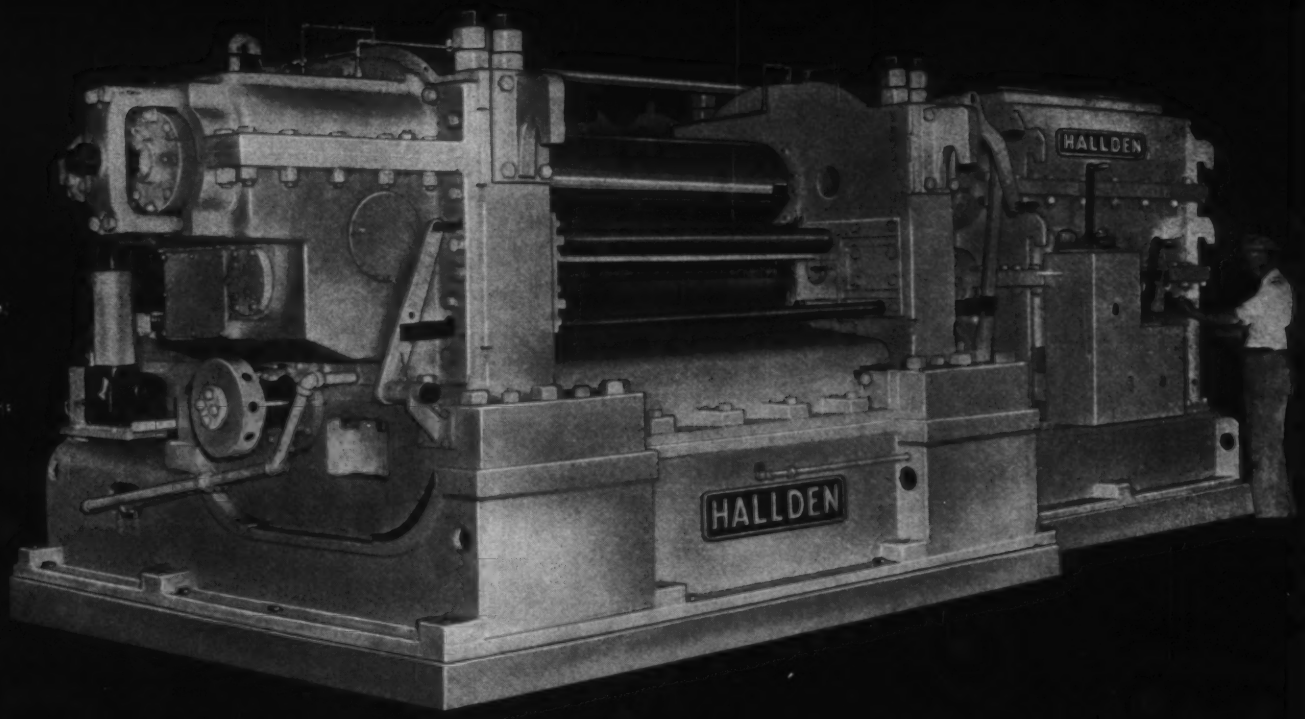


With 35 years of experience in the production of low carbon steel wire rods, and a proud record of being the first to produce high carbon steel wire rods in Japan over 30 years ago.
Kobe Steel, with the completion of its new No. 5 mill in June of 1961, now has production capacity of 740,000 tons annually and is known as the oldest, largest and most versatile manufacturer of steel wire rods in the Far East.
Particularly famous for the high quality of its high carbon, alloy and stainless steel wire rods, Kobe Steel exports to every major area of the world.

KOBE STEEL WORKS, LTD.

Head Office: Kobe, Japan Cable: "KOBESTEEL KOBE"
New York Office: 80 Pine St., New York 5, N.Y., U.S.A.
Düsseldorf Office: Immermann St., 10, Düsseldorf, West Germany

Main Products: Wire Rods — High and Low Carbon Steel, Alloy and Stainless Steel
Wire Products · Bars, Pipes and Tubes · Arc Welding Electrodes · General Machinery



SYNCHRONIZED ROTARY SHEET SHEARS

Combine Accuracy, Speed, Durability

- **Infinite length-of-cut control**
- **Full synchronization**
- **Minimum adjustment**
- **Reliable performance**

All these features are assured by such Hallden design extras as hardened torque correcting surge gears, dynamically balanced components, precision fitted parts.

Hallden shears are engineered and built to meet the requirements for the most modern high speed strip processing lines.

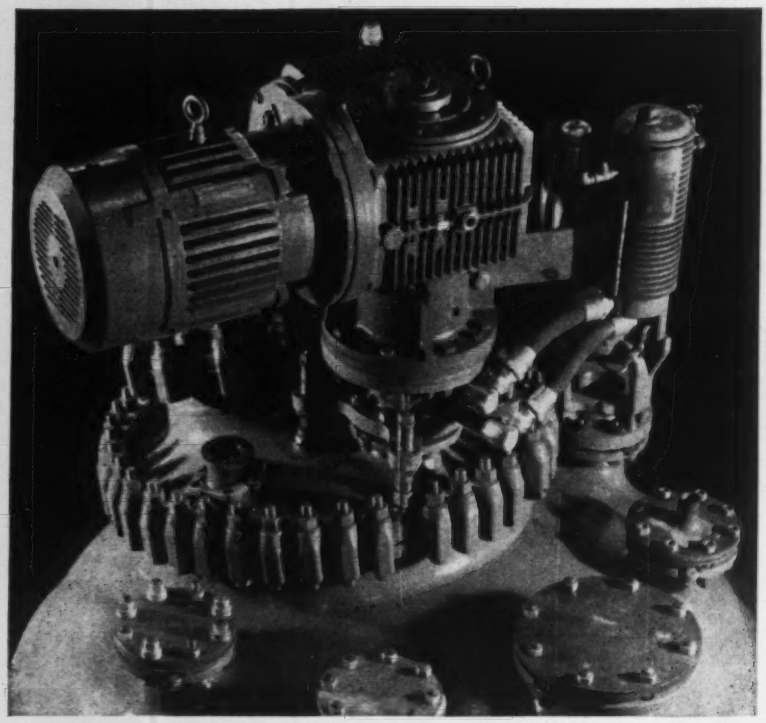
For custom designed synchronized flying shears for all high production strip shearing, consult Hallden, the worlds foremost designers of flying shears.

HALLDEN

The world's leading machinery manufacturers rely on Hallden shears in their process lines

THE HALLDEN MACHINE COMPANY • THOMASTON, CONNECTICUT

Associates: The W. H. A. Robertson & Co., Ltd., Bedford, England



ROCHESTER, N. Y.—The Pfaudler Co. reports space savings and reduced maintenance on their new line of TW Agitation Drives for glassed-steel and alloy mixing vessels due to vertical hollow-shaft double-enveloping worm gear reducers by Cone-Drive Gears, Division Michigan Tool Co., 7171 E. McNichols, Detroit 12, Michigan.

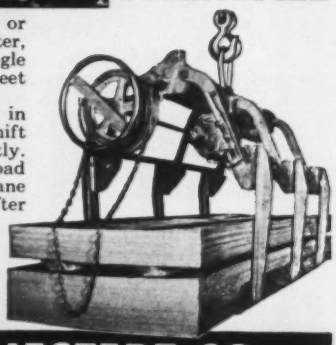
Wide or Narrow...

1 C-F LIFTER HANDLES THEM ALL

Whether your production requires a few or many widths of sheet steel, 1 C-F Lifter, with its wide range of jaw and carrying angle adjustments will probably meet all your sheet handling requirements.

Adjustments are made by the operator in a few seconds, permitting the Lifter to shift from wide to narrow sizes almost instantly.

Because it can pick up, carry and unload more loads per hour, using less man and crane time than any other method, a C-F Lifter will soon pay for itself.



Bulletin SL-30 gives you the complete story of C-F Lifter advantages to you. Ask for it today. There's no obligation.

CULLEN-FRIESTEDT CO.

1303 South Kilbourn Avenue • Chicago 23, Illinois

NEW EQUIPMENT

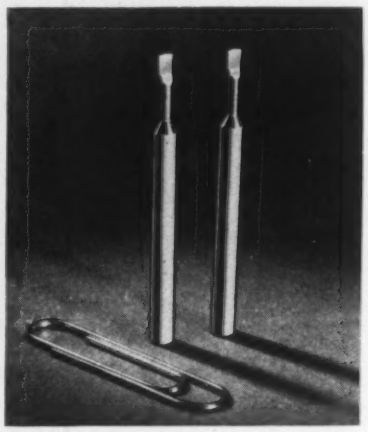
clude: Checking the thickness of a nonferrous metal on a nonferrous base; gaging the thickness of a nonferrous coating on a non-conductor;

and measuring the conductivity of a nonferrous metal. This compact, portable instrument can be used wherever there's a 110-v ac outlet. (Twin City Testing Corp.)

For more data write No. 208 on postcard, p. 247

Solid-Carbide Tools

These tools are especially designed for precision boring of small, close-tolerance holes. Seven miniature sizes permit boring holes from 0.020-0.080 in. in diameter. All the tools have solid-carbide construc-



tion for added rigidity. Top-rake and relief angles are highly lapped to mirror-like finishes. (The Atrax Co.)

For more data write No. 209 on postcard, p. 247

Industrial X Rays

This 150-curie, mobile cobalt unit suits directional or panoramic industrial inspection. It's ideal for use in foundries and steel fabrication plants on high-production ra-

This is the first in a Series of Comments on various and vital aspects of Service in the Ferroalloys Industry.

at Vanadium Corporation of America

SERVICE COMES FIRST

Over 55 years ago when we began business as one of the first U.S. producers of ferroalloys, the factors of Price, Quality and Service were, even as they are today, the governing features of any progressive business organization. But time has proven that their interrelationship has changed; Service has now taken on new importance.

Service is Vital The first two—Price and Quality—are actually basic. It is obvious that the producer must charge a competitive price or his goods pile up on the shelves—unsold. He must also offer quality merchandise or his customers soon go elsewhere. Service, on the other hand, varies widely from producer to producer, and it is in this area that the buyer stands most to gain.

Service, however, cannot stand alone without the supporting influence of a fair return for the product sold, which not only makes available a quality product but also allows the producer to explore for new low-cost sources of raw materials, to maintain modern efficient production equipment, supply technical service and carry on the all-important Research and Development activities.

Few Offer All Three We believe that any producer in our industry today who does not provide for all three—Price, Quality and Service—is failing in his responsibility to his customers. Nearly all producers offer competitive price—somewhat fewer furnish top quality—but the great majority, including suppliers of foreign-produced material, are not prepared to extend more than minimum service.

Vanadium Corporation, on the other hand, offers you complete service. Here's what we mean:

Our Own Mines—Integrated mining and milling facilities provide, on a long-term basis, a consistent supply of high grade ores of controlled quality. Producers who rely on the purchase of distressed lots in the world market may temporarily profit but jeopardize the customers' requirements for a dependable and continuing supply of quality products.

Modern Plant Facilities—Our plants are among the most modern in the industry and are strategically located near consuming industries.

Production Planning—An extensive production-planning group assures you of an adequate supply of quality products—when you need them! Expeditious handling of every order is facilitated by a private network of teletype equipment linking district offices, plants, Research Center and headquarters offices.

Research Center—We are among the few ferroalloy producers who can claim the distinct advantages of fully equipped modern research facilities. This R and D supervision, over short-and long-term work, assures the development of new and better products, and provides adequate technical customer service.

Pilot Plant—Here complete facilities prove a product under actual operating conditions before it is ever offered commercially. The plant also provides complete customer service.

Engineering Sales—Widely experienced technical field personnel are located in district offices near you, always on call.

Field Stocks—Adequate stocks of required products are available in mill quantities when you need them.

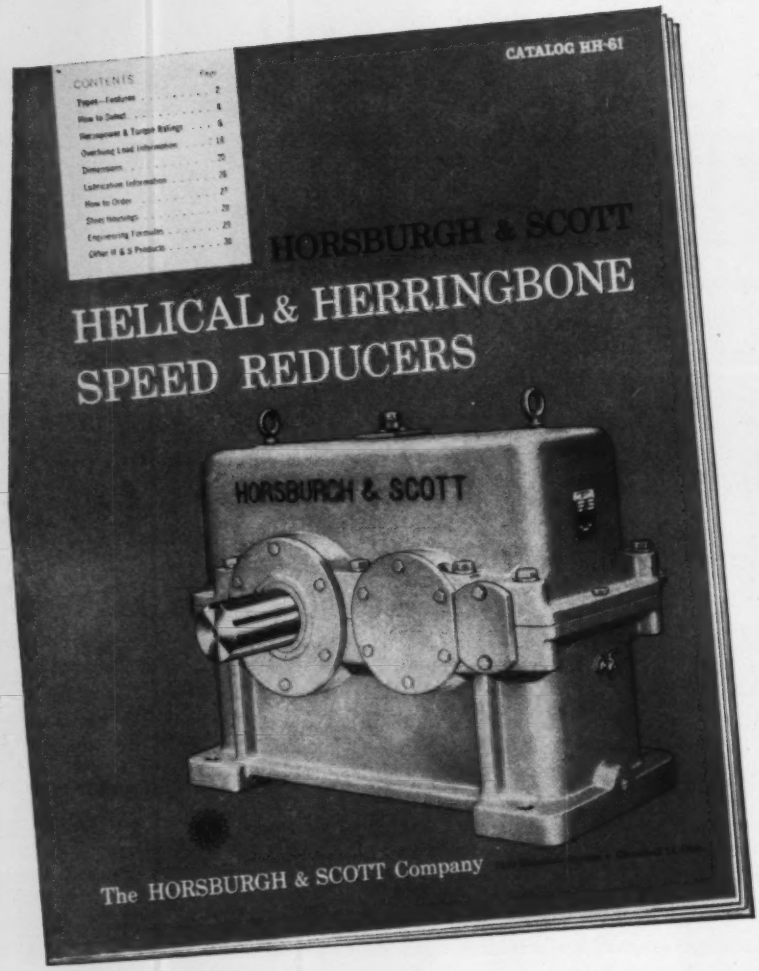
Distribution—Vancoram Products are available from distributors with warehouses conveniently located throughout the country.

Over 4,000 VCA employees staff these facilities with a devoted interest in you—the customer.
When you think of ferroalloys—think of Vancoram, where SERVICE COMES FIRST.

SERVICE COMES FIRST

VANADIUM CORPORATION OF AMERICA

420 Lexington Ave., New York 17, N.Y. · Chicago · Cleveland · Detroit · Pittsburgh



. . . A New

HORSBURGH & SCOTT

SPEED REDUCER CATALOG

To Simplify Selection of Speed Reducers for Industry

New catalog features include:

New Sizes • Improved Ratings • More Ratios • Latest AGMA Thermal Ratings • Simplified Selection • Easy-to-use Overhung Load Ratings • Steel Housings.

Write for **Catalog HH-61**—on your company letterhead, please.

Let our engineering staff give you prompt assistance with your enclosed gearing requirements.

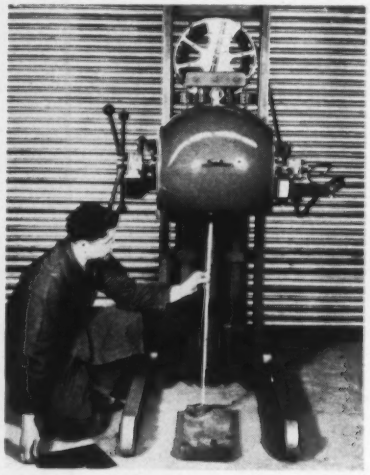
H&S

The HORSBURGH & SCOTT Co.

5112 Hamilton Avenue • Cleveland 14, Ohio

NEW EQUIPMENT

diography of heavy sections. The 150-curie source requires an exposure time only 7 pct of that

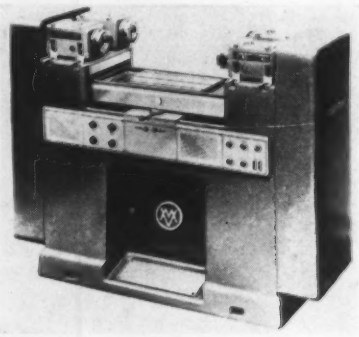


needed with a 10-curie source. Removing a plug in the source container and adding guide tubes converts the unit from directional to panoramic use. The source can then be cranked out by remote control. Safety locks and warning lights assure complete safety. (Picker X-Ray Corp.)

For more data write No. 210 on postcard, p. 247

Precision Boring

Driven by an independent motor through a change-gear box, a precision boring mill's feeds range from



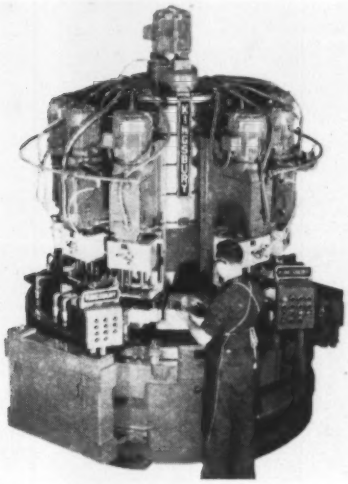
1/3-11ipm. A rapid traverse, in both directions, is obtained by a separate motor with an electric brake. This arrangement provides either 72- or 144-ipm traverse rates. An automatic cycle allows multiple combinations such as fast approach, controlled cutting feeds, and reg-

ulated starting and stopping of the spindles. Mechanical feed reduces thermal distortion of machine elements. Without oil circulation, ambient-temperature rise is maintained within 4°C, at the maximum spindle speed of 4000 rpm. (George Sharp Inc.)

For more data write No. 211 on postcard, p. 247

Valve-Plate Machine

Eleven units, with 71 spindles, drill, ream, burr, countersink, and trepan both sides of the work at a gross rate of 450 parts per hour. This is the performance of a new center-column machine for valve plates used in automotive compressors. Its 63-in. index table holds 12 double-chucking work fixtures. The work rests on one face in the

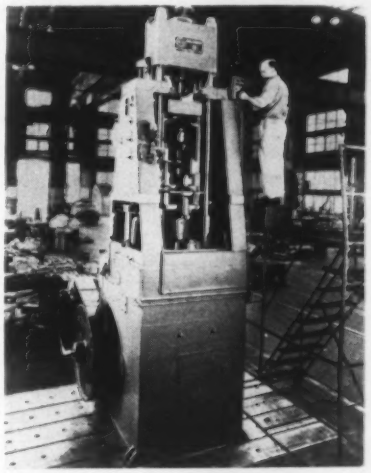


left side for the second chucking. Pins for two holes locate the work in each chucking; while the second chucking has a third hole for proofing. Each unit also has a bushing carrier that clamps the work down during its cycle. (Kingsbury Machine Tool Corp.)

For more data write No. 212 on postcard, p. 247

Big Squeeze

Bringing a full 2000-ton force to bear for shaping powder compacts, this new mechanical press boosts production of large powder parts. Engine cylinder liners, washing-machine bushings, and similar powered-iron compacts with surface areas up to 5 sq in. are examples of the larger powdered parts that are now produced economically. The press itself is a four-column,

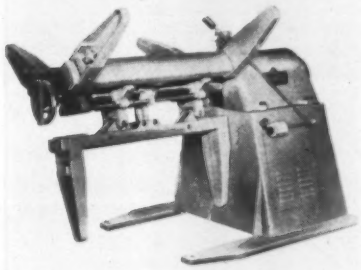


eccentric rear unit. Vital statistics include: 12-in. die opening; upper punch-die opening adjustable from 0-5 in.; production rates of 6-24 strokes per minute; and shuttle feed along with a pressure-lubrication system. (Baldwin - Lima - Hamilton Corp.)

For more data write No. 213 on postcard, p. 247

Centering Reels

The latest addition to a full line of press equipment is a heavy-duty automatic-centering spindle reel. This 5000-lb capacity reel is available in both plain and motorized models. All models have three support arms with quick-adjustment keepers. The plain models use an electric brake and rheostat to pre-



vent stock over-runs. Motorized models have a gear-head motor. (Cooper Weymouth, Inc.)

For more data write No. 214 on postcard, p. 247

Ultrasonic Welder

Remote location of the power source, away from the welder, is a

Capacability means

Reliability

When it comes to refractories, *reliability* is Basic. You won't have to "walk a tightrope" during peak or emergency periods; steelmakers know they can depend on Basic. Its 40-year record of uninterrupted shipments is unique in the refractory industry and a valuable plus when reliability counts.

Served by two leading railroads, Basic's Maple Grove, Ohio plant ships around-the-clock — getting steelmaking refractories where they're needed . . . fast. To support rail transportation, extensive truck facilities are available for short hauls and emergency shipments.

If you use basic refractories, you can depend on Basic's *capacity* and *ability*. Write for 24-page booklet outlining application of Basic's more than thirty dead-burned dolomites, ramming and gunning refractories, patching materials and tar-bonded linings for basic oxygen furnaces.

BASIC INCORPORATED
845 HANNA BUILDING
CLEVELAND 15, OHIO

significant feature in a new 4000-w ultrasonic spot welder. Small interconnecting cables, which can be 100 ft or more in length, link the two units. This makes installation and moving of the welder a simple matter. It fits into close-packed production areas, where space is at a premium. The new unit is of commercial interest for a variety of metal and bi-metal joining. It's effective for joining refractory metals, because its operation is essentially a solid-state process. (Sonobond Corp., a subsidiary of Aeroprojects, Inc.)

For more data write No. 215 on postcard, p. 247

Electric Hoist

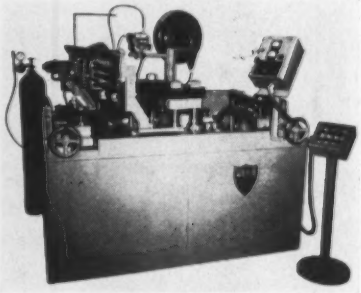
Completely new in compact design, a new line of electric hoists is available in capacities from one to three tons with single-, two-speed or variable-speed controls. All motors are fully-enclosed ball-bearing types, built to NEMA specifications. Every motor is rated on a basis of 30-

minute duty cycles. Anti-friction precision ball or roller bearings, mounted in splash - oil - lubricated gear chambers, support both ends of every shaft. The external expanding jaw uses a self-adjusting cam-type motor brake. A solenoid operates this jaw. The drum is all steel with a liberal drum-to-cable ratio—which reduces wear and cable fatigue. (Wright Hoist Div., American Chain & Cable Co., Inc.)

For more data write No. 216 on postcard, p. 247

Shear-Welder Team

An automatic combination shear-and-welding machine is now on the market. It provides continuous strip in any thickness from 0.04-



0.25 in. for roll forming, tube manufacturing, punch-press operations or coil-strip processing lines. This combination unit automatically aligns the trailing end of a processed coil and the leading end of a new coil. Then it clamps them together and shears and squares the ends. After fixing the proper gap for arc-

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Job lot

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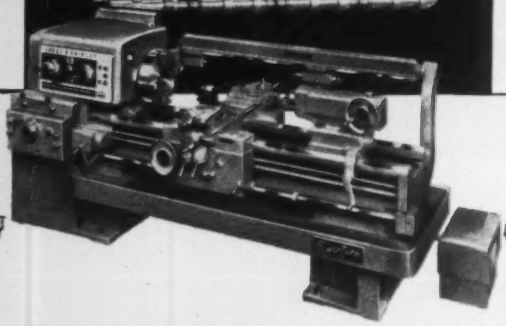
Production run

Minimum Cost



POWERTURN 90° COPYMATIC CARRIAGE

POWERTURN 45° COPYMATIC CARRIAGE

You've got a good thing going for you when you install a POWERTURN COPYMATIC. Choose engine lathe operation or instantly change over to tracer controlled duplication. Lodge & Shipley offers you a choice of 45° or 90° hydraulic tracing slides. No awkward projections, built for efficiency and operator convenience.

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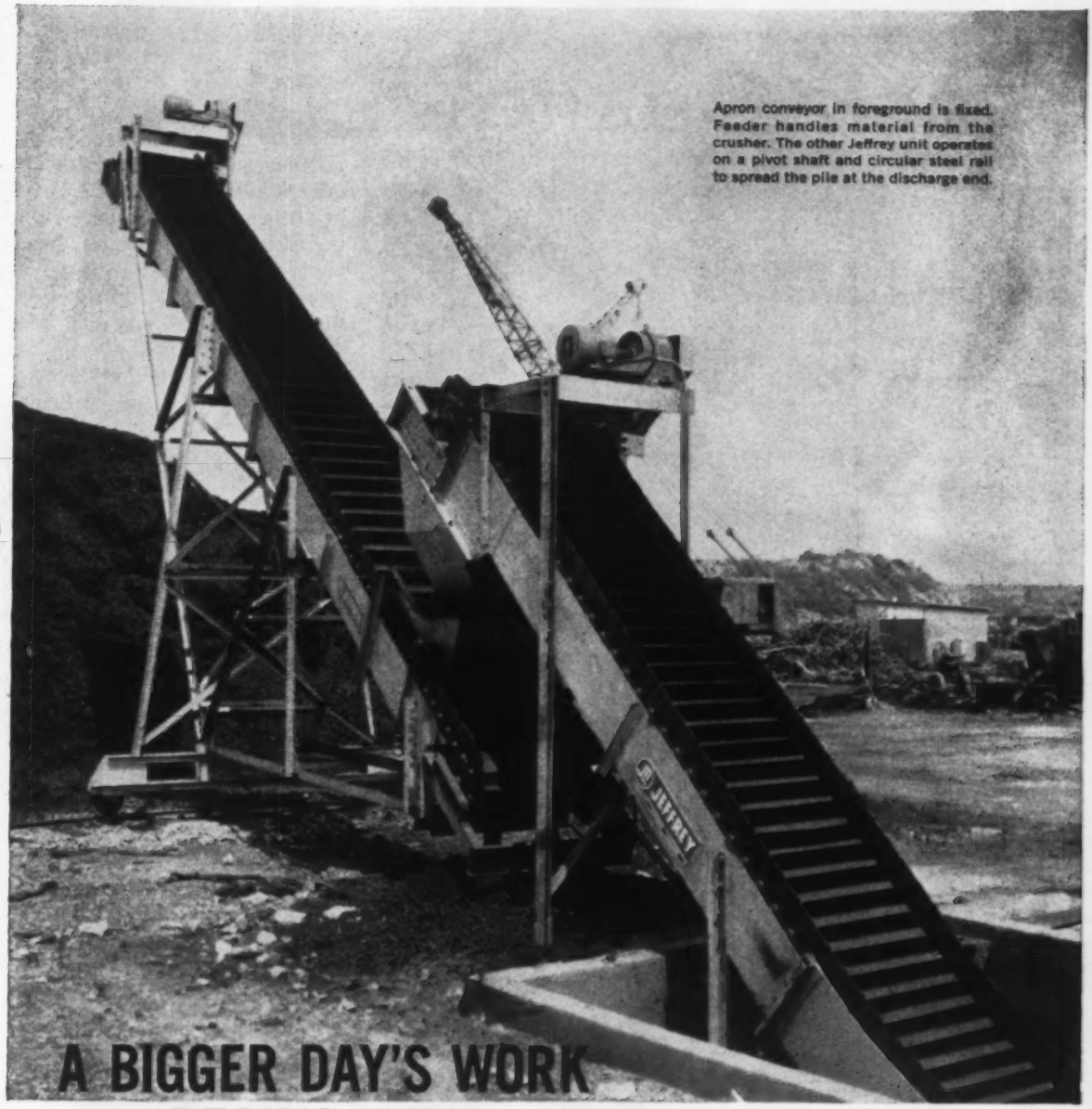

Apron conveyor in foreground is fixed. Feeder handles material from the crusher. The other Jeffrey unit operates on a pivot shaft and circular steel rail to spread the pile at the discharge end.

A BIGGER DAY'S WORK BEGINS WITH JEFFREY CONVEYORS

Take Chas. J. King, Inc. of Brooklyn, New York, for example. Two Jeffrey 36″ Hinged Apron Conveyors handle crushed, shovel-size metal turnings—at a rate of 50 tons per hour. The turnings weigh 50 pounds per cubic foot and are transferred at a rate of 60 feet per minute. That's moving—in anyone's language.

The aprons are made of steel flights on Jeffrey STR Chain. Each flight is fitted with a lifting blade. Units come complete with steel frames, chain drives, reducers and 3 hp motors.

Get a bigger day's work! Get the facts on Jeffrey conveying equipment today. Competent engineering facilities and service help assure satisfaction every time. For more information, write for Catalog 980, The Jeffrey Manufacturing Company, 925 North Fourth Street, Columbus 16, Ohio.

If it's conveyed, processed or mined, it's a job for Jeffrey

JEFFREY

Want to strip "unstrippable" coating?

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Even tough EPOXY FINISHES peel off in Oakite STRIPPER S-A

Burn off an epoxy finish from a reject as a last resort? Not at all necessary. Oakite STRIPPER S-A strips metals clean. That's true for multiple coats as well as single coat epoxy finishes. Look at STRIPPER S-A's record:

- *A 3/16" thick coating built up from layers of epoxy coating and wrappings of fiber glass was stripped from gun barrels by overnight soak in Stripper S-A. Everything tried previously had failed.*
- *Brass plated steel parts were stripped of their epoxy finish in matter of minutes.*
- *Workholding spindles and racks laden with at least 10 coats were stripped to bare metal by a short soak. Paint hooks formerly burned clean are now soaked clean instead.*

This powerful stripper is safe for all metals except zinc and magnesium. And it's safe to the user, since it works cold . . . has no flash point . . . rinses with water.

STRIPPER S-A is but one of a long list of superior strippers by Oakite. Some are specially formulated for use on steel . . . aluminum . . . other metals. Some for removing lacquers . . . tough synthetic finishes. Still others are designed especially for removing paint from vertical surfaces. Whatever your paint-stripping problem—Oakite is bound to have the answer. Ask your local Oakite man or send for paint-stripping bulletin F-7893. Oakite Products, Inc., 34E Rector Street, New York 6, N. Y.

it PAYS to ask Oakite

OAKITE

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years' leadership in industrial cleaning

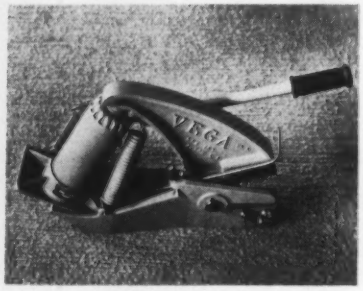
NEW EQUIPMENT

welding, the machine automatically joins the strips with little or no increase in joint thickness over the parent metal. Welding speeds range from 90 ipm on 0.06-in. thick steel to 50 ipm on 0.25-in. thick steel. Complete time for clamping, shearing and welding ranges from 40-60 seconds, depending on material thickness and width. Any width from 2-17 in. can be processed on the machine. Flash removal isn't required. (Guild Metal Joining Equipment Co.)

For more data write No. 217 on postcard, p. 247

Hydraulic Shear

Measuring only 5½ x 12 x 12 in. high, a hand-operated hydraulic shear uses a 5-ton jack to apply pressures. The frame on this shear is a graphitic-steel casting. Blades



are interchangeable in a matter of seconds. By switching blades you can cut rounds, flats or angles. Maximum capacity is ½ x 2 in. mild steel. (Vega Enterprises)

For more data write No. 218 on postcard, p. 247

Surface Grinder

The latest addition to a line of surface-grinding machines has a new table that's wide in proportion to its length. The dimensions are 12 x 24 in. It's best suited for a tool shop engaged in highly-accurate die grinding. However, the machine takes on general production work with the addition of an automatic slot- and surface-grinding attachment, a wet-grinding attachment and a vertical position indicator. The grinder's massive spindle mounts on the flange. This allows

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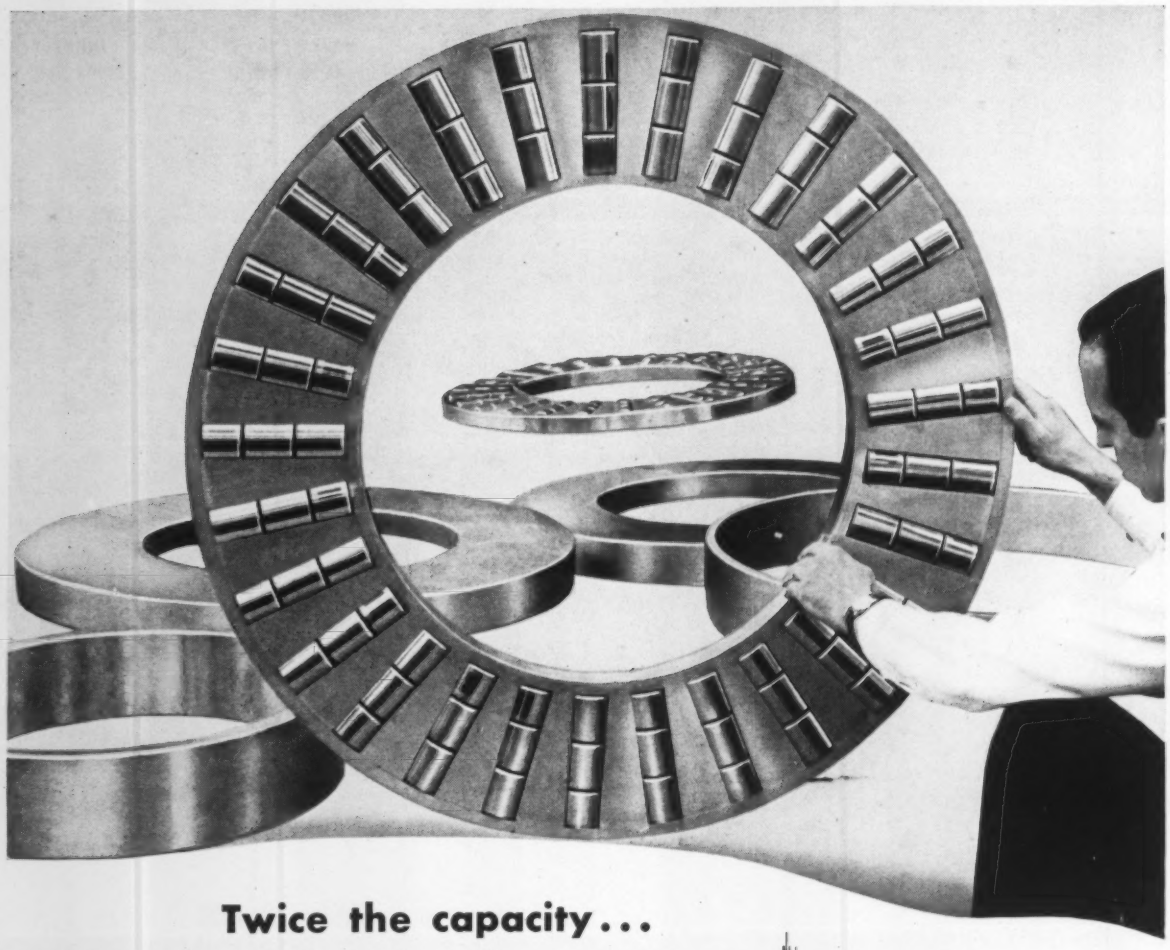


Twice the capacity... without increasing radial space!

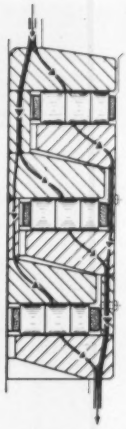
ROLLWAY®

TANDEM THRUST BEARINGS

Rollway Tandem Thrust Bearings like the one shown here are continuing to prove themselves in long, trouble-free performance. This 5,000-pounder is built into a giant plastics extruder at one of the world's largest chemical plants, and provides a dynamic capacity of over *4.8 million pounds!*

Precision built, it has 165 crowned cylindrical rollers mounted in two tandem stages. Distributing the load axially, it permits reduction in the radial space requirement to house a bearing of comparable thrust capacity.

Whatever your application, Rollway has a thrust bearing that will do the job better. Ask for catalog PT-659.



Arrows indicate path of thrust load in tandem-type bearing.

Drawing at left illustrates *three-stage* design—one of the larger sizes in the Rollway-originated tandem thrust series. It is included in the broad range of Rollway thrust bearings that offers seven *standard* cataloged types . . . plus special-purpose types made to your order.

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BEARINGS
COMPLETE LINE OF RADIAL AND THRUST CYLINDRICAL ROLLER BEARINGS

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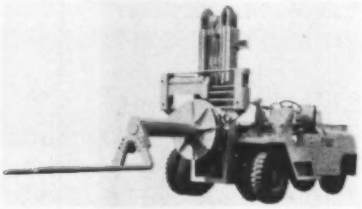
precise slot and shoulder grinding, always a difficult problem in machining intricate die sections. A 5-hp motor supplies the power. (Browne & Sharp Mfg. Co.)

For more data write No. 219 on postcard, p. 247

Furnace Charger

Fast, mechanized furnace charging—with a minimum of heat loss—is made possible by a lift truck



that's equipped with a 180° rotator. Both the rotator and the truck are made by the same company. The truck carries ingots, pigs or boxes filled with scrap in the rotator's hydraulically-actuated arms. Its compactness and handling ease enable the operator to conduct furnace-charging operations safely and with maximum visibility. The ultrafast charging time made possible by this equipment results in a better melt. It also greatly reduces manpower requirements. (Towmotor Corp.)

For more data write No. 220 on postcard, p. 247

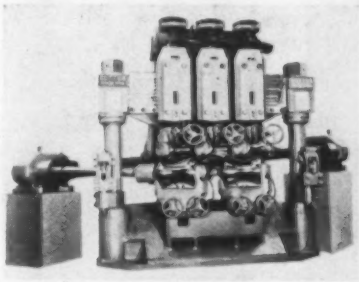
Straps Automatically

This new machine automatically straps packages between a minimum size of 6 x 6 in. (or any periphery not less than 24 in.) and a maximum size of 20 x 20 in. It handles any length. The machine packages all sizes of containers within the specified limits, without adjustments. And, it handles any width of rayon strapping from ¼-¾ in. (American Viscose Corp.)

For more data write No. 221 on postcard, p. 247

Straightens Tubes

A new, five-roll, rotary machine precisely straightens steel tubes at high speeds. In fact, the machine handles ½-4 in. pipe at throughput speeds of 175-700 fpm. Key to this performance is a patented drive unit. In this five-roll machine, two



large straightening rolls are opposed by three small pressure rolls. All five are driven by a single motor. The patented synchro unit mounts between the drives for the two banks of opposed roles. Feeding is easy and positive. Since surface speeds for each bank of rolls are automatically coordinated, roll wear is held to a minimum. (Sutton Engineering Co.)

For more data write No. 222 on postcard, p. 247

Tube-Type Furnace

Manually operated, a tube-type furnace features a choice of

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When you need machine work or specially built machinery of any kind, you'll find Sun Ship qualified to do the job exactly to your specifications. We have machine tools of every size, and the facilities and skills born of long experience.

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Dimensions.....24" x 36"
Capacity.....2000 lbs.
Lift.....24" min. to 42" max.
Price: F.O.B. Chicago $245.00

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POSITIVE PERFORMANCE
Self-locking Acme screws hold load safely, securely, at any height.

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No projecting parts—all four sides accessible; crank studs at both ends; three table surfaces.

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Seven large truck line terminals.
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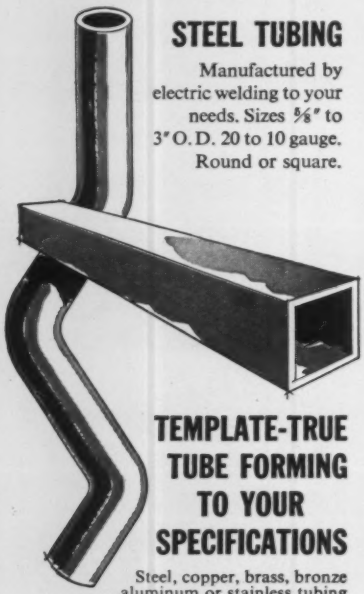

STEEL TUBING
Manufactured by electric welding to your needs. Sizes ⅝" to 3" O. D. 20 to 10 gauge. Round or square.

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Steel, copper, brass, bronze aluminum or stainless tubing fabricated to your specifications. Sizes ⅜" to 6" OD, 20 to 10 gauge.
Thirty-four years of experience in forming, welding, beading, bending, stamping of formed tubes.
Top-flight engineering service.
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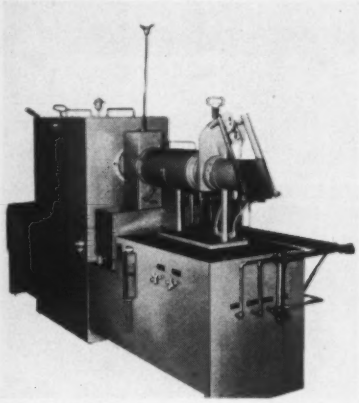
NEW EQUIPMENT

quenches. A chute between the heat chamber and the cooling jacket permits either an oil quench or atmosphere cooling. The choice is dictated by the needs of a particular process. Automatic flame curtains

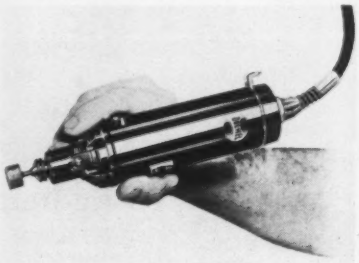


are used at the entry or charging door and at the discharge door. They prevent the infiltration of air into the muffle device. The new furnace has a 6-in. ID, an Inconel muffle, a 20-in. long heating chamber and a 20-in. long water-jacketed cooler. It provides a maximum heating temperature of 2000°F. (Lindberg Engineering Co.)

For more data write No. 223 on postcard, p. 247

Industrial Grinder

Developing 27,000 rpm, an industrially-rated hand grinder sustains its high torque under load. It



handles a wide range of jobs, including polishing and grinding of dies and molds. It's also handy for production deburring and general tool- and die-room use. The motor is housed in shockproof bakelite and it has a 3-wire cord for maximum safety. With a collet capacity of 1/16, 3/32 and ⅛ in., the newcomer accommodates all standard wheels and burrs. And it weighs only 18 oz. (Dremel Mfg. Co.)

For more data write No. 224 on postcard, p. 247

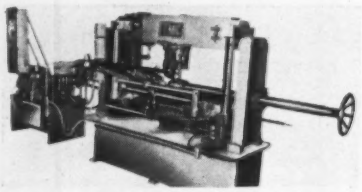
Simplifies Brazing

A new work coil aids parallel brazing of two copper tubes with different outside diameters. Key to the process is a 10-kw generator which maintains a production rate of 5 fpm. If a bent tube jams the feed rollers, a photo-electric control automatically shuts off the power. (Induction Heating Corp.)

For more data write No. 225 on postcard, p. 247

Automatic Press

High-speed automatic roll forming of steel conveyor rolls up to 2½-in. diam x 48-in. long is now possible. A heavy-duty hydraulic press can form both ends of 700 steel conveyor rolls per hour. This new press is available in two mod-



els. One is completely automatic. It has a special feeding device that automatically feeds cut tubing down a chute into the press. Without any operator, the press roll-forms both tube ends at the same time. Then it ejects the finished rolls. The other model works the same way except it has no automatic feeder. In this case, the loading and unloading are done manually. (Trimble Mfg. Co., Inc.)

For more data write No. 226 on postcard, p. 247

Pusher Conveyor

With trolley capacities up to 4000 lb, an overhead-conveyor system combines the advantages of continuous and semi-continuous operation. Spur tracks with manual switches may be located at any point on the outer heavy-duty track. Thus, carriers may circulate continuously with work that can be quickly lifted on or off the line. When

New GENERAL ELECTRIC SHOPTROL system

...monitors individual work stations...displays production status at a control center for timely reactions to factory conditions.

The GE SHOPTROL SYSTEM is a factory monitoring and data collection system that monitors work stations and records production data at a central point. Each work station's status is visually displayed on a Status Monitor. Status Monitors present a panoramic view of up-to-the-minute factory conditions for visual display at the Production Control Center. Work stations have an operator control station, or an alarm station terminating at the Control Center. Depending on complexity of communication needed and data to be transmitted, a paging selector may be added to each work station.

The Shoptrol System records, in hundredths of hours, time elapsed for operations, set-up and tear down, unavoidable delays, machine running, and machine off conditions. The Shoptrol System can record time elapsed, or count pieces or operations.

The Shoptrol System provides direct signal communications from work stations to the Production Control Center. The operator control station and paging selector have phone jacks to provide entry into the telephone intercom. Units are ruggedly built for dependable life in factory conditions.

Totals recorded from the Status Monitors at the end of shift produce information for production control analysis and management decision making. The data is readily convertible to punched cards or paper tape for input to a data processing system. For more information, write for brochure CPB-152, General Electric Company, Computer Department, Section 91N9, Phoenix, Arizona, or contact your nearest General Electric Computer Department District Office listed below.

THE GE SHOPTROL SYSTEM CONTRIBUTES TO GREATER PRODUCTION EFFICIENCY BY:

...providing constant communication between production control center, foreman, and work station operators.

...collecting and displaying current production data for each work station.

...increasing accuracy of production records.

...providing immediate production status for management at all times.

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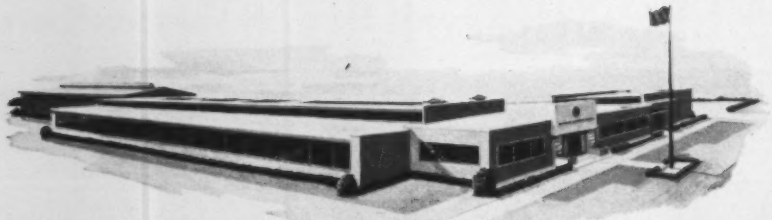
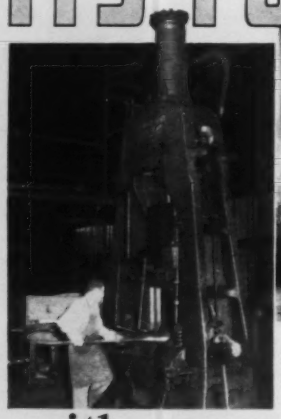


MATHIAS KLEIN & SONS INC CHICAGO MODERNIZES ITS FORGE SHOP



(Above) Six of the ten CECO-DROPS in Mathias Klein forge shop

One of the new CECO-DROPS

with 10 CECO-DROPS

REPLACING 13 BOARD DROP HAMMERS

The over-a-century-old firm of Mathias Klein & Sons, Inc., manufacturers of tools of the highest quality for lineman, electricians, and mechanics—drop-forged tools like pliers, wrenches and climbers—has kept abreast and ahead of the times by constantly improving their facilities for producing these fine products. Their forge shop, one of the best in the country, formerly equipped with 13 board drop hammers, has, over recent years, been completely converted to Ceco-Drops. 10 Ceco-Drops now do the work formerly done by the 13 board drops, with less maintenance, greater safety and easier operation. Many other forge shops all over the country are converting to Ceco-Drops, on the basis of proven performance. How about yours?

CHAMBERSBURG ENGINEERING COMPANY

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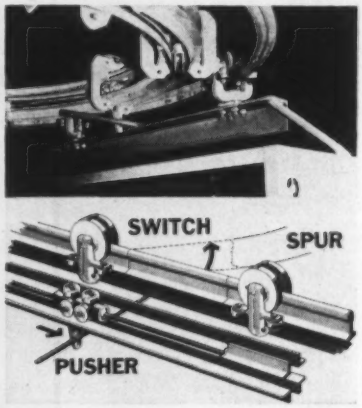
A new bulletin, fully describing the Ceco-Drop, is just off the press. Write for a copy of Bulletin 105-L-1

DESIGNERS AND MANUFACTURERS OF THE IMPACTER

desired, the carriers can be switched into spur stations—if a longer unloading time is desired. A pusher dog is bolted to the clevis on the



bottom of each trolley body. It pushes against pusher bars which are attached to the free-rolling monorail-trolley carriers. (The American Monorail Co.)

For more data write No. 227 on postcard, p. 247

Industrial Vacuum

Compressed air activates a new industrial vacuum unit. This newcomer handles liquid pick-up jobs. It moves heavy liquids or sludges. And it can also handle steel or wood chips, sawdust and other waste materials. Having no electric motor or moving parts, this vacuum operates

in hazardous areas where electric-powered units aren't recommended. (American Cleaning Equipment Corp.)

For more data write No. 228 on postcard, p. 247

Slices Solid Aluminum

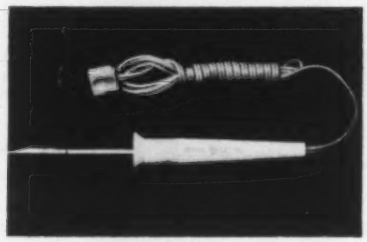
With the development of this automated cold-sawing installation, large aluminum-alloy billets and

slabs are no longer a cutoff problem. It cuts fast, holds close tolerances, and provides smooth surfaces. The new equipment centers around the saw itself, a hydraulically-operated, high-speed unit. Equipped with up to 100-in. blades, the saw takes on 36-in. diam billets and slabs up to 20-in. thick x 80-in. wide. A 200-hp, 2-speed motor drives the saw at 3000 or 6000 fpm, depending on the alloy that's being cut. (The Loma Machine Mfg. Co., Inc.)

For more data write No. 229 on postcard, p. 247

Soldering Irons

Ideally suited for maintenance and repair work, small 120-v soldering irons are available with 30- and 50-w integral tip-and-heater assemblies. A special heater is designed into each durable ironclad tip for maximum heat at the tip's



point. Pyramid, chisel, spade and cone tips—3/16-⅜ in.—will soon be available for these new low-cost soldering irons. (General Electric Co.)

For more data write No. 230 on postcard, p. 247

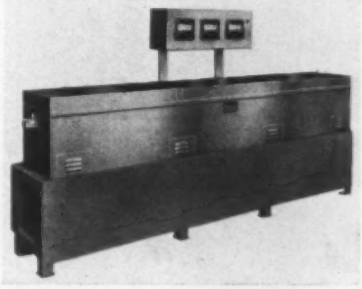
Car-Bottom Kiln

Here's a car-bottom, electrically-heated, periodic kiln for diversified uses such as the development and production of ferrites and other electrical ceramics, refractories, grinding wheels and porcelains. Operation of the kiln is fully automatic. The preset cycle can be changed or altered at any time, either in the firing or in the cooling, even after the cycle has started. The new kiln also maintains a uniform temperature automatically. Since the rate of temperature rise and the quench cycle are variable at any time, the kiln permits effective use of closely-controlled, protective atmospheres. The unit's working chamber is 21 x 60 x 36 in. Gross load is 1600 lb. It can be cooled from 2500°F to 200°F in 8 hours. (Kiln Div., Lindberg Engineering Co.)

For more data write No. 231 on postcard, p. 247

Soldering Furnace

Encased in stainless steel, a conveyorized soldering furnace proves useful for a wide variety of high-

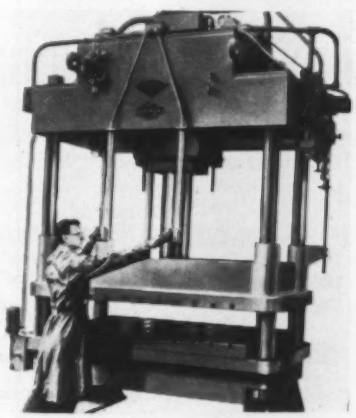


volume production jobs. Special-alloy conveyors provide full load support throughout the furnace. A three-section removable top eases inspection and maintenance work. All power transformers, contactors and other electrical controls are mounted in the furnace base. (K. H. Huppert Co.)

For more data write No. 232 on postcard, p. 247

Hydraulic Trim Press

Equipped with an adjustable deceleration valve, a heavy-duty trimming press exerts loads up to 100 tons. High output hinges on an approach velocity of 900 ipm and a return speed of 875 ipm. A much-



slower trimming action of 59 ipm produces neatly-sheared clean castings. The die area measures 36 x 72 in. Stroke is 30 in. (Greenlee Bros. & Co.)

For more data write No. 233 on postcard, p. 247

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Imagination

When it comes to oxygen furnace refractories, *imagination* is Basic. And, Basic can be your "fountainhead" of new refractory ideas. Take TARBLOK and TARMIX for example.

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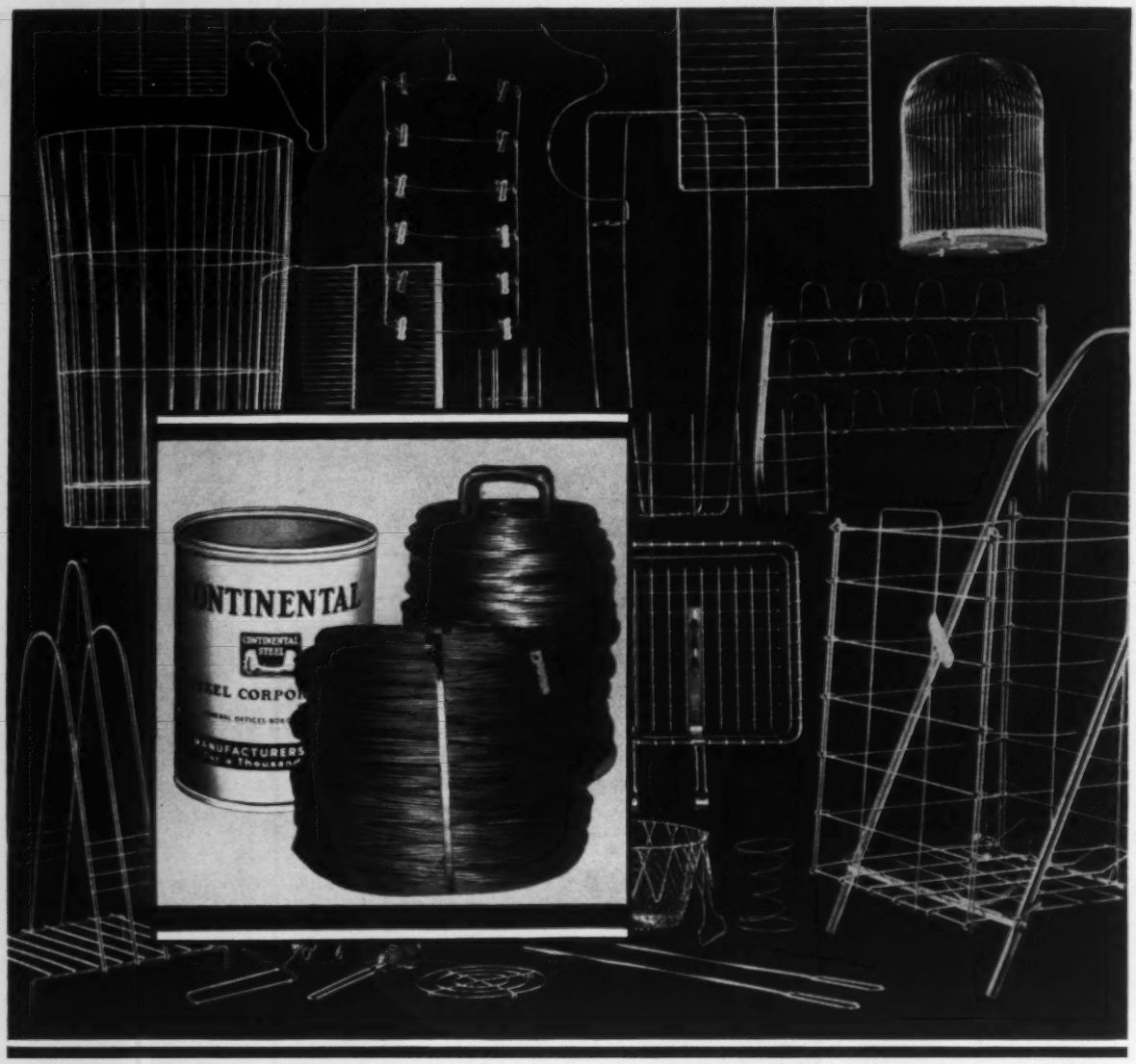

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Chance of Price Increase Fades

Even before President's attack on possible steel price increases, the odds were less than 50-50.

Market strength will still be a factor as industry ponders higher employment costs after Oct. 1.

■ President Kennedy's attack on steel prices diminished the possibility of a broad steel price increase.

But the President's warning to the industry (See p. 143) affected the price outlook only by a matter of degree. Even before the President's letter to the major steel companies warning against price increases, there was less than a 50-50 chance of a general steel price increase.

(The IRON AGE has consistently stated this year that pressure from the White House would be brought against steel price increases. Generally, price increases have been widely rumored as a result of wage increases Oct. 1.)

Price Factors—Since President Kennedy's request not to raise steel prices was expected, the steel price outlook is only slightly altered. These factors will all have to be considered before the steel leaders make their decision on prices:

1. Pressure of the Federal government against price increases. This was brought to bear fully in last week's action by President Kennedy. This action, in turn, followed a previous attack on prices by leading Democratic senators.

2. Competition from other materials.

3. Competition from steel imports.

4. The domestic steel industry's own weak price situation. However, the price structure has firmed with the recent strengthening of the steel market.

Market Outlook—On the general steel market, apparent automotive labor peace (subject to settlement of local issues) has strengthened the immediate market outlook. The market has been advancing on a broad base without any real support from the auto industry. Logically, automakers would have come into the market for heavy September deliveries of steel as the lines of 1962 cars go into production. But in spite of general market strength, September has been a disappointment in regard to automotive steel orders.

But now a real surge of orders for October delivery is expected from the automakers. They have scheduled 600,000 cars for October and the recent rate of steel orders is not heavy enough to sustain that rate of production. As a result, October now looks like the best month of the year so far with November and December holding to a good order rate.

Late Summer Surge—In review of the late summer pattern, a surge of late orders moved August up to a surprising extent.

On the price front, tinplate prices will not go up Oct. 1. Under the pricing system, mills must give users 35 days advance notice. There has been no notification, indicating there can be no hike Oct. 1.

District Steel Production Indexes
1957-59=100

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	115	114	107	78
Buffalo	100	96	86	81
Pittsburgh	98	101	94	57
Youngstown	98	92	94	62
Cleveland	125	123	104	76
Detroit	136	132	119	102
Chicago	111	109	105	87
Cincinnati	122	119	120	75
St. Louis	101	119	107	82
Southern	108	111	105	76
Western	109	118	108	81
U. S. Index	109.1	109.0	102.5	75.2

Source: American Iron & Steel Institute

Steel Production, Composite Prices

Production	Last Week	Two Weeks Ago	To Date 1961	To Date 1960
(Net tons, 000 Omitted)	2,032	2,030	64,172	75,186
Ingot Index				
(1957-59=100)	109.1	109.0	95.7	112.1
Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel base (Cents per lb)	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.44	$66.44	$66.44	$66.41
Scrap No. 1 hvy (Gross ton)	$39.50	$39.17	$37.83	$31.83
No. 2 bundles	$26.17	$25.83	$24.50	$23.17

Purchasing Research Pays Off

Many companies are learning that extensive purchasing research can pay off in savings.

IRON AGE interviews R. F. Benson, manager of purchasing research, U. S. Steel Corp.

■ "Little attention is given to a complaint to a purchasing department unless the problem area is specifically identified." This is the belief of R. F. Benson, manager of purchasing research, U. S. Steel Corp.

Mr. Benson says there are thousands of complaints going in and out of a purchasing office every year.

BENSON: Hear complaints . . .

Unless these can be backed by specific facts, he notes, it's a tough job getting corrections.

This need is one of the reasons for purchasing research at U. S. Steel.

Growing Staff—For a wide range of purchasing functions, the company has found it pays to have a special task force digging up facts. Purchasing research was formally organized in 1954 as a one-man operation. It has grown into an eight-man job with accountants, engineers and statisticians on the staff.

As one part of its job, the group provides on-call service to the individual products buyers. A standardization program may entail the boiling down of 600 different specifications. Proposals may have to be explored with operators, accountants, suppliers, safety men and other key personnel.

When tied to his daily routine, the U. S. Steel buyer can turn to purchasing research for help in developing a plan of action.

Cost Reduction — New market conditions may eventually call for extensive purchasing research. In the present buyers' market, U. S. Steel has been going over minor items.

Says Mr. Benson: "We are finding more opportunities for cost reduction simply by mobilizing requirements than were ever possible before."

He explains that volume orders are so attractive to suppliers today that it pays to consolidate needs of even the most trivial items.

Another Function — A second general function of purchasing research is to break-down communications barriers between front-line users and central purchasing. An engineer from the department travels to plants on a continuing basis. He talks to foremen, learns about problems, and encourages regular communications. Although official complaint forms are provided, it is felt that this first-hand contact is needed.

"The users should make their problems known," says Mr. Benson. "But, in fact, they don't."

Another task for purchasing research men is performance measurement. The department reports the cost saving ideas of individual buyers. It makes an annual tabulation of buying improvements for all products. The latter pinpoints areas due for attention by showing which products have had no buying change for two or three years.

Powerful Tool—"This is a powerful tool for the next year," says Mr. Benson.

Finally, the research staff is concerned with purchasing procedures. It has been working to mechanize the preparation of repetitive orders. Economic order quantities have been programmed. Electronic inventory control has been devised for general stores in all U. S. Steel plants.

Here's a sample of how this research has paid off at U. S. Steel:

. . . And dig for the answers.

Recently, operating departments complained about the replacement parts service of an important supplier. Mr. Benson had four accountants track down every order for a period of several years. They learned that the supplier was averaging 60-days on deliveries.

Armed with this information, Mr. Benson met with key officials of the supply company. The research report documented the problem and pointed to means of improving supply and backlog.

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Warehouses Delay Big Stock Buildup

Despite increased sales, service centers are still not building up inventories on a big scale.

But they are watching mill deliveries for any signs of a sudden stretchout.

■ Warehouses are not yet rebuilding inventories on a large scale.

Some have increased their stocks of sheet products and structurals. But, generally, they are delaying any large stock building. With service centers accounting for almost 20 pct of all steel shipments, this delay could have a big impact on the market.

Close Watch—If mill deliveries continue stretching out, the upsurge in demand will hit hard at the warehouse level. With this in mind, service center men are keeping a weather eye on mill delivery schedules. Some are checking their suppliers on a daily basis.

While cautious on inventory building, the warehouses are optimistic about sales. Right now, they expect fourth quarter sales will be as much as 20 pct over third quarter levels.

Tied to Sales—They are gearing purchases to that expected sales rate. But they are holding inventories to the bottom side of expected sales gains.

In part, this may be based on the need to keep stocks low until after end-of-the-year inventory taxes are calculated. Beyond that point, the warehouses are expected to start inventory building in strength. The run-out of steel labor contracts next year will make that move imperative.

Sheet and Strip—When auto production gets underway in volume, flat-rolled shipments will increase quickly. Some needed steel will go out this month. But the big bulge in shipments to automakers will come in October. September sheet orders for most mills are holding at about August levels. Several mills in the **Detroit** area, however, say orders are running below August.

Other sheet products are moving well. Galvanized deliveries are from 3 to 8 weeks or longer. Mill opinions differ on whether or not demand for galvanized is tapering off.

Electric sheet deliveries are listed as late September or October by **East Coast** suppliers. Some electric companies are using more carbon and low alloy steels. This is cutting into demand for the intermediate grades of silicon steel, a large mill reports. But the market for grain-oriented and other high-performance specialty sheet is growing.

Bar — Sales are improving, but the market is lagging a little behind sheet products. Some **Midwest** buyers are moving November tonnage up into October, and October tonnage up into September. Construction equipment makers and farm machinery builders are among those mentioned. In general, bars are still available on fairly fast delivery.

PURCHASING AGENT'S CHECKLIST

Wealth of new steel products put on market in response to customer demands. P. 139

Steelmakers reply to U. S. request that industry hold price line this fall. P. 143

Is the copper market set for an order rebound? P. 148

Plates and Shapes—Demand for both products keeps moving up, especially at **East Coast** and **Pittsburgh** markets. The improvement is slower in the **Chicago** area. Sheared mill plate at a large **Eastern** mill is now on five weeks delivery. Strip mill plate is three weeks. Shapes remain at 2-4 weeks, but rolling schedules are filling in faster.

At **Pittsburgh,** heavy, wide plate is leading the market with deliveries stretching out. Wide flange beams are also moving up. Producers feel there is little inventory building involved. Fabricators are ordering for specific jobs a little sooner.

Mills at **Chicago** are still looking for more orders in both plates and shapes. Some warehouse and construction industry buying has helped structurals to a degree. Rail car orders have also improved. But, as yet, deliveries haven't changed.

Pipe and Tubing — August was probably the best month of the year for tubular products. One **Pittsburgh** mill expects a rising trend through October. However, day-to-day ordering by buyers makes estimating difficult. The upward rise for tubular products has been a flat one. Mill sources say present sales levels are only "normal."

Stainless—Mill bookings are improving. Although mill sales are still very competitive, orders are arriving in better volume. A **Detroit** area mill says August was the best month of the year. So far, September orders are better than August.

A vast potential for stainless in the **West Coast** auto muffler market is predicted by Logan T. Johnston, president of Armco Steel Corp. He also believes new specialty stainless grades will be an increasing market factor.

Pre-Plated Metals—Price reductions on two utility grades of pre-plated metals have been announced by American Nickeloid Co., Peru, Ill., producers of pre-plated metals and vinyl-to-vinyl laminates.

The two metals falling in the new low-cost range are designated as C-grade Nickel Steel and C-grade Copper Steel.

COMPARISON OF PRICES

(Effective Sept. 11, 1961)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Sept. 11 1961	Sept. 1 1961	Aug. 14 1961	Sept. 13 1960
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	14.10
Stainl's C-R strip (No. 302)	49.50	*49.50	52.00	52.00
Tin and Terneplate: (per base box)				
Tin plates (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchant bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	46.75
Wrought iron bars	14.90	14.90	14.90	14.90
Wire: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 10 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.49¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Sept. 11 1961	Sept. 1 1961	Aug. 14 1961	Sept. 13 1960
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.68	$70.68	$70.68	$70.57
Foundry, South Cin'ti.	71.92	71.92	71.92	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.11	70.11	70.11	70.07
Basic Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese 74-76 pct Mn. cents per lb‡	11.00	11.00	11.00	11.00
Pig Iron Composite: (per gross ton)				
Pig iron	$66.44	$66.44	$66.44	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$37.50	$37.50	$35.50	$31.50
No. 1 steel, Phila. area	40.50	40.50	39.50	34.50
No. 1 steel, Chicago	40.50*	39.50	38.50	29.50
No. 1 bundles, Detroit	35.50	35.50	35.50	28.50
Low phos., Youngstown	43.50*	42.50	41.50	35.50
No. 1 mach'y cast. Pittsburgh	45.50	45.50	45.50	47.50
No. 1 mach'y cast. Phila.	49.50	49.50	49.50	49.50
No. 1 Mach'y cast. Chicago	50.50*	49.50	48.50	45.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$39.50*	$39.17	$37.83	$31.83
No. 2 bundles	26.17*	25.83	24.50	23.17
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	14.75-15.50	14.75-15.50	14.75-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	$31.00	$31.00	$31.00	$33.00
Copper, Lake, Conn.	31.00	31.00	31.00	33.00
Tin, Straits, N. Y.	121.50†	125.50**	118.50	102.375
Zinc, East St. Louis	11.50	11.50	11.50	13.00
Lead, St. Louis	11.00	11.00	11.00	11.80
Aluminum, ingot	26.00	26.00	26.00	26.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite

Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strip.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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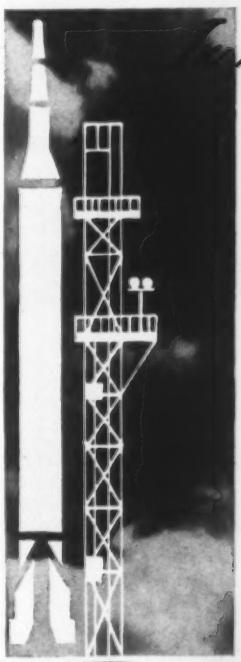
*Appears in the Sept. 7 - Sept. 21 issues.



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Monel	(3)	19-9 DX	
Hastelloy C	(4)	19-9 DL	
Hastelloy X	(4)	A286	
L605 (Haynes #25)	(4)	Rene 41	(2)
Carpenter 20	(5)	"A" Nickel (electronic grade)	

(1) Reg. U.S. Pat. Off. Armco Steel Corp.
(2) Reg. Trade Mark of General Electric Co.
(3) Reg. Trade Mark of Int. Nickel Co.
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The Big Question: Japanese Plans

Japanese buying plans for the fourth quarter will have a definite effect on many key markets.

For now, scrapmen don't know what to look for in the way of foreign orders.

■ Most scrap markets remain firm this week with very little new activity reported.

The big question in the market now is the Japanese buying plans for the fourth quarter. The general feeling is that the Japanese will be buying less tonnage than during the present quarter. Adding to this speculation is the fact that there are shipping problems in Japan just now.

But some scrapmen—especially in New York—look for increased orders from the Japanese in the fourth quarter.

Also, European orders could fall off sharply before the end of the year. Though these orders have been steady for several months, there are reports that German buyers may drop out of the market in the near future. Others might follow.

Domestically, mills are starting to buy with renewed interest. But it still hasn't caused prices to climb as high as many dealers had earlier expected. Supply and demand, in most instances, are about equal.

Pittsburgh — The market has paused in its advance. Some scrapmen feel prices are ready to level off. But most signs still point to strength. On an early list, No. 1 railroad heavy melting scrap moved up about $1; railroad specialties jumped $2. In the dealer market, the top local price for No. 2 bundles is still $26. But this has become the minimum, even for small tonnages. A week ago, there were attempts to buy bundles at $25. A price of $38 to the dealer is said to have produced enough No. 1 heavy melting to meet current requirements at one mill. There is no new local demand for this grade, but prices in nearby districts are keeping pressure on the local supply.

Chicago — Dealer pricing continues to stiffen. Small movements of factory bundles at existing levels or slightly under have failed to weaken the market outlook. Though foundries continue to fight price advances, creeping gains in electric furnace grades are again evident. Blast furnace grades are also tightening. Brokers show considerable caution on covering new orders. They expect this fairly strong market to hold.

Philadelphia—Local demand is up again. But the current prices seem to attract enough tonnage. Of course, Japanese commitments for the fourth quarter may be made in another week or two and this could result in stronger prices. Most scrapmen expect area mills to stay in the market for the next few months.

New York—Speculation on Japanese buying plans for the next quarter, continued demand from most European buyers, and growing strength in nearby U. S. markets combine to move steelmaking grades up $1, on appraisal, this week.

Detroit — General tone of the market is somewhat less exciting than last week. But weakness is not apparent. It's a bit easier to buy and a bit harder to sell just now. Exporting seems to be relaxing as a stimulus to this market. Canadians are taking a look at what Detroit has to offer.

Cleveland—Market edged up another $1 on steelmaking grades as a Valley-area mill bought plate scrap for $44. Blast furnace grades have come to life, some moving out of the area. Two-ft foundry steel was sold in Cleveland at $37 with a $2 springboard.

Cincinnati—Market has strengthened somewhat since the first of the month. But most of the real strength is still out-of-town. Blast furnace activity has picked up as operators apparently use scrap to increase the hot metal yield.

St. Louis—Higher prices are bringing some scrap out of hiding. Supply and demand seem about equal. Prices appear firm and are expected to hold for awhile. However, some dealers are still bullish.

Birmingham—There is fair demand in this district but no one is buying in quantities. Prices are unchanged. Most of the activity is confined to foundry grades. Pipe manufacturers are buying limited amounts.

Buffalo—All of the area mills are out of the market for the present time. However, dealers see no necessity to drop prices as outside markets show continued strength.

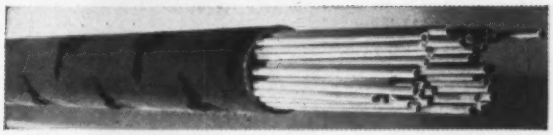
Boston—Buying has fallen off a little. But most dealers don't appear too worried. They look for a pickup soon.

West Coast—All along the Coast, prices continue strong. Exporting remains the mainstay of this market. There's talk that the Japanese will reduce their buying order for the next quarter.

Houston—The market is marking time pending the outcome of scrap negotiations with Japanese buyers. The district mill says it is receiving scrap under current orders at a steady rate.

3 METHODS OF PRODUCTION BRAZING ...Which is best for you?

FLUX COATED ROD



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SCRAP PRICES *(Effective Sept. 11, 1961)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	38.00 to 39.00
No. 1 factory bundles	47.00 to 48.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	37.00 to 38.00
Machine shop turn.	15.00 to 16.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	19.00 to 20.00
Low phos. punch'gs plate	45.00 to 46.00
Heavy turnings	32.00 to 33.00
No. 1 RR hvy. melting	43.00 to 44.00
Scrap rails, random lgth.	46.00 to 47.00
Rails 2 ft and under	52.00 to 53.00
RR specialties	48.00 to 49.00
No. 1 machinery cast.	45.00 to 46.00
Cupola cast.	37.00 to 38.00
Heavy breakable cast.	33.00 to 34.00
Stainless	
18-8 bundles and solids	190.00 to 195.00
18-8 turnings	155.00 to 120.00
430 bundles and solids	85.00 to 90.00
410 turnings	55.00 to 60.00

Chicago

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 dealer bundles	41.00 to 42.00
No. 1 factory bundles	45.00 to 46.00
No. 2 bundles	26.00 to 27.00
No. 1 busheling	40.00 to 41.00
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	20.00 to 21.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	21.00 to 22.00
Low phos. forge crops	50.00 to 51.00
Low phos. punch'gs plate, ¼ in. and heavier	48.00 to 49.00
Low phos. 2 ft and under	46.00 to 47.00
No. 1 RR hvy. melting	44.00 to 45.00
Scrap rails, random lgth.	50.00 to 51.00
Rerolling rails	62.00 to 63.00
Rails 2 ft and under	53.00 to 54.00
Angles and splice bars	48.00 to 49.00
RR steel car axles	61.00 to 62.00
RR couplers and knuckles	48.00 to 49.00
Cupola cast.	44.00 to 45.00
Cast iron wheels	36.00 to 37.00
Malleable	49.00 to 50.00
Stove plate	39.00 to 40.00
Steel car wheels	47.00 to 48.00
Stainless	
18-8 bundles and solids	190.00 to 195.00
18-8 turnings	110.00 to 115.00
430 bundles and solids	95.00 to 100.00
430 turnings	55.00 to 60.00

Philadelphia Area

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 dealer bundles	43.00 to 44.00
No. 2 bundles	26.00 to 27.00
No. 1 busheling	42.00 to 43.00
Machine shop turn.	13.00 to 14.00
Mixed bor. short turn.	16.00 to 17.00
Cast iron borings	14.00 to 15.00
Shoveling turnings	19.00 to 20.00
Clean cast. chem. borings	29.00 to 30.00
Low phos. 5 ft and under	43.00 to 44.00
Low phos. 2 ft punch'gs	45.00 to 46.00
Elec. furnace bundles	44.00 to 45.00
Heavy turnings	27.00 to 28.00
RR specialties	44.00 to 45.00
Rails, 18 in. and under	52.00 to 54.00
Cupola cast.	39.00 to 40.00
Heavy breakable cast.	41.00 to 42.00
Cast iron car wheels	42.00 to 43.00
Malleable	48.00 to 49.00
No. 1 machinery cast.	49.00 to 50.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	9.00 to 10.00
Shoveling turnings	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Low phos. 18 in. and under	42.00 to 43.00
Rails, random length	42.00 to 43.00
Rails, 18 in. and under	47.00 to 48.00
No. 1 cupola cast.	33.00 to 34.00
Heavy breakable cast.	30.00 to 31.00
Drop broken cast.	44.00 to 45.00

Youngstown

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	28.50 to 29.50
No. 1 dealer bundles	41.00 to 42.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	17.00 to 18.00
Shoveling turnings	19.00 to 20.00
Low phos. plate	43.00 to 44.00

Cleveland

No. 1 hvy. melting	$38.50 to $39.50
No. 2 hvy. melting	25.00 to 26.00
No. 1 dealer bundles	38.50 to 39.50
No. 1 factory bundles	43.00 to 44.00
No. 2 bundles	22.50 to 23.50
No. 1 busheling	38.50 to 39.50
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Cut structural & plates, 2 ft & under	42.00 to 43.00
Low phos. punch'gs plate	39.50 to 40.50
Drop forge flashings	38.50 to 39.50
Foundry steel, 2 ft & under	36.00 to 37.00
No. 1 RR hvy. melting	42.50 to 43.50
Rails 2 ft and under	49.00 to 50.00
Rails 18 in. and under	52.00 to 53.00
Steel axle turnings	28.00 to 29.00
Railroad cast.	48.00 to 49.00
No. 1 machinery cast.	48.00 to 49.00
Stove plate	40.00 to 41.00
Malleable	52.00 to 53.00
Stainless	
18-8 bundles	180.00 to 185.00
18-8 turnings	105.00 to 110.00
430 bundles	85.00 to 90.00

Buffalo

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 busheling	31.00 to 32.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	14.00 to 15.00
Cast iron borings	15.00 to 16.00
Low phos. plate	37.00 to 38.00
Structural and plate, 2 ft and under	39.00 to 40.00
Rails 2 ft and under	48.00 to 49.00
Scrap rails, random lgth.	38.00 to 39.00
No. 1 machinery cast.	43.00 to 44.00
No. 1 cupola cast.	37.00 to 38.00

St. Louis

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	31.00 to 32.00
Foundry steel, 2 ft.	33.00 to 34.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	26.00 to 27.00
Machine shop turn.	16.50 to 17.50
Shoveling turnings	18.50 to 19.50
Cast iron borings	26.00 to 27.00
No. 1 RR hvy. melting	40.00 to 41.00
Rails, random lengths	43.00 to 44.00
Rails, 18 in. and under	46.00 to 47.00
RR specialties	43.00 to 44.00
Cupola cast.	37.00 to 38.00
Heavy breakable cast.	32.00 to 33.00
Stove plate	32.00 to 33.00
Cast iron car wheels	34.00 to 35.00
Rerolling rails	56.00 to 57.00
Unstripped motor blocks	34.00 to 35.00

Birmingham

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	38.00 to 39.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	38.00 to 39.00
Machine shop turn.	18.00 to 19.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	10.00 to 11.00
Electric furnace bundles	38.00 to 39.00
Elec. furnace, 3 ft & under	36.00 to 37.00
Bar crops and plate	44.00 to 45.00
Structural and plate, 2 ft.	43.00 to 44.00
No. 1 RR hvy. melting	39.00 to 40.00
Scrap rail, random lgth.	42.00 to 43.00
Rails, 18 in. and under	46.00 to 47.00
Angles and splice bars	44.00 to 45.00
No. 1 cupola cast.	42.00 to 43.00
Stove plate	42.00 to 43.00
Cast iron car wheels	34.00 to 35.00
Unstripped motor blocks	31.00 to 32.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	25.00 to 26.00
No. 2 dealer bundles	19.00 to 20.00
Mixed. bor. and turn.	5.00 to 6.00
Machine shop turnings	5.00 to 6.00
Shoveling turnings	7.00 to 8.00
Clean cast. chem. borings	19.00 to 20.00
No. 1 machinery cast.	38.00 to 39.00
Mixed yard cast.	34.00 to 35.00
Heavy breakable cast.	32.00 to 33.00
Stainless	
18-8 prepared solids	160.00 to 165.00
18-8 turnings	80.00 to 85.00
430 prepared solids	65.00 to 70.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	34.00 to 35.00
Drop forge flashings	34.00 to 35.00
Machine shop turn.	12.00 to 13.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	15.00 to 16.00
Heavy breakable cast.	28.00 to 29.00
Mixed cupola cast.	31.00 to 32.00
Automotive cast.	41.00 to 42.00
Stainless	
18-8 bundles and solids	175.00 to 180.00
18-8 turnings	75.00 to 80.00
430 bundles and solids	70.00 to 75.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	31.00 to 32.00
Machine shop turn.	4.00 to 5.00
Shoveling turnings	8.50 to 9.00
Clean cast. chem. borings	17.50 to 18.00
No. 1 machinery cast.	38.00 to 39.00
Mixed cupola cast.	30.00 to 31.00
Heavy breakable cast.	30.50 to 31.50

San Francisco

No. 1 hvy. melting	$45.00
No. 2 hvy. melting	42.00
No. 1 dealer bundles	31.00
No. 2 bundles	$25.00 to 26.00
Machine shop turn.	17.00
Cast iron borings	17.00
No. 1 cupola cast.	50.00

Los Angeles

No. 1 hvy. melting	$44.00
No. 2 hvy. melting	41.00
No. 1 dealer bundles	31.00
No. 2 bundles	$25.00 to 26.00
Machine shop turn.	16.00
Shoveling turnings	16.00
Cast iron borings	16.00
Elec. furnace 1 ft and under (foundry)	52.00
No. 1 cupola cast.	47.00 to 48.00

Seattle

No. 1 hvy. melting	$45.00
No. 2 hvy. melting	42.00
No. 2 bundles	$26.00 to 27.00
No. 1 cupola cast.	36.00 to 37.00
Mixed yard cast.	31.00 to 32.00

Hamilton, Ont.

Brokers buying prices per net ton on cars:

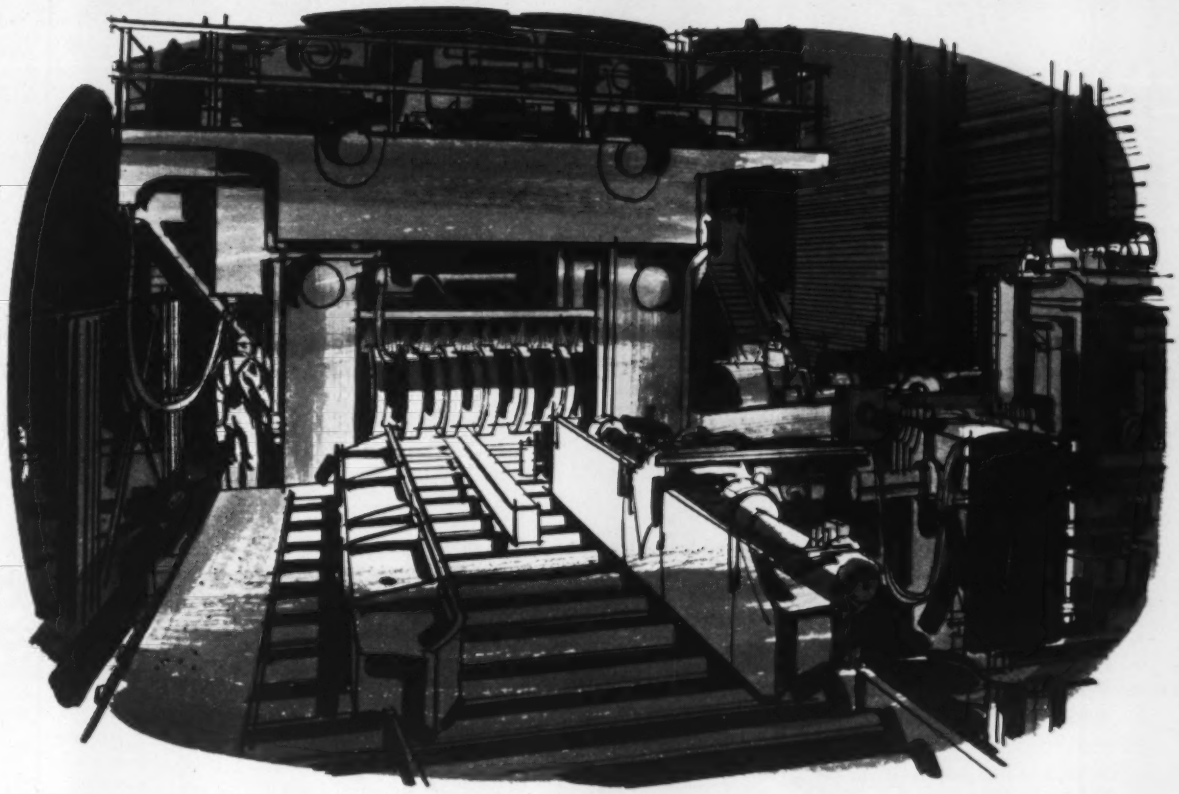
No. 1 hvy. melting	$30.00
No. 2 hvy. melting cut 3 ft and under	27.00
No. 1 dealer bundles	31.00
No. 2 bundles	23.50
Mixed steel scrap	22.00
Bush., new fact., prep'd.	30.00
Bush., new fact., unprep'd	24.00
Machine shop turn.	8.00
Short steel turn.	12.00
Mixed bor. and turn.	12.00
Cast scrap	32.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	33.00
No. 2 bundles	24.00
Machine shop turn.	10.00
Shoveling turnings	13.00
Cut structural plate 2 ft & under	$44.00 to 45.00
Unstripped motor blocks	28.00 to 29.00
Cupola cast.	36.00 to 37.00
Heavy breakable cast.	28.00 to 29.00

DANGEROUS INTRUDERS IN IRON AND STEEL SCRAP



SULPHUR . . . FRIEND OR FOE?

Sulphur is an element of several faces. As a sulphuric acid compound it occupies an important place in the steel industry where it is used for cleaning metal, the recovery of ammonia products from gas and in making chemical analyses.

As an element in the composition of steel, however, sulphur is welcome only for the free machining properties it brings to certain grades. A small percentage can more than double the speed and ease with which steel bars can be machined into gears, screws, bolts, and other small parts. There is even a free machining type of stainless steel. In these instances, sulphur serves the steel industry as a friend.

But, sulphur can be an enemy as well when it appears in the steelmaking furnace as an unknown residual element.

Sulphur makes steel hot short, meaning that it cracks and tears in rolling or forging processes. It can ruin a heat of stainless steel when its presence is unknown. Therefore, scrap, high in sulphur content, unless it is properly segregated, must be considered a foe.

For scrap of known analysis, our personnel, equipment and strategically located facilities are specifically geared for the purchase or sale of dependably segregated metals. We welcome your inquiry.

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Aluminum Boom May Come Soon

Heavier shipments and firm prices point to an aluminum boom, according to a Reynolds Metals Co. executive.

With the economy moving forward rapidly again, the signs are evident.

▪ "An aluminum boom could happen sooner than anyone has the temerity to predict."

Members of the American Mining Congress who heard Walter L. Rice, vice president of Reynolds Metals Co., make this statement this week feel the aluminum executive would have liked to have had the temerity.

Says Mr. Rice further, "Consider this fact: In the three big advances of the economy in the last 10 years —in 1953, 1955, and 1959—aluminum shipments zoomed up 25 pct or more.

"With the economy moving forward at a rapid rate, goaded by the Administration's stepped-up spending for housing and other domestic programs, and with the new armaments program due to add billions more in payrolls, who is to say it can't happen again?"

Record Rate — Right now, says the Reynolds vice president, aluminum shipments are at an annual rate of more than 2.5 million tons. The all-time record was 2.48 million tons shipped in 1959.

Production was off 9 pct, and shipments 4 pct, in the first half of 1961 from the same period last year. So total shipments for 1961 will likely be only 2,425,000 tons—4 pct better than last year.

Mr. Rice's major contention—the antecedents of a boom are already in evidence.

"Lately, prices have started to firm and increase slightly on some products. And if the industry's shipments continue to accelerate, this reaction should spread to other product lines."

Continued Uptrend — He figures that "given a continuation of the business uptrend," shipments in 1962 could hit 2.9 million tons.

This record high would have to be considered a boom. But the real importance goes far beyond this figure.

Such a rate would perceptibly reduce the overcapacity in the aluminum industry. This fact, and any inflationary movements would likely lead to customer stockpiling of aluminum. It could completely close the gap between supply and demand, and possibly even reverse the situation.

Ideal Grounds—And this would give aluminum producers as close to ideal grounds as they are going to get for putting over price hikes they have been insisting they need for the past year or so.

Mr. Rice qualified his remarks. "If you ask me how soon we can expect demand to assert itself at the higher levels of our plant capacity, I can't answer that—unless you can tell me when the nation will again be producing 7½ million cars, building and buying 1½ million homes, and purchasing the new appliances that go with these higher levels of well-being."

Mr. Rice, and Reynolds Metals Co., are really expecting a huge boom in aluminum within just a few years, even though Mr. Rice was careful to qualify his statements. This can readily be seen by superimposing a statement made by his boss, Richard S. Reynolds, Jr., president of the company, at an International Light Metals Congress earlier this summer:

"I believe aluminum stands now on the threshold of even more rapid development which will make the past 20 years pallid by comparison."

Tin

It took the highest price in the last 10 years to convince the General Services Administration that tin is, or will likely be, in short supply in the U. S.

It has a classified tonnage, known to be very large, of tin which it can sell to U. S. consumers. But this requires an act of Congress.

Last week, with the cooperation of the State Dept. and Office of Civil and Defense Mobilization, GSA began drafting a bill calling for release of government tin.

Whether the bill will pass before Congress adjourns is questionable. But the news knocked the market down a few cents.

Tin Prices for the Week

September 5—124.625; September 6—121.50; September 7—122.25; September 8—122.00; September 11—121.50.*

*Estimate.

Primary Prices

(cents per lb.)	current price	last price	date of change
Aluminum Ingot	26.00	24.70	12/17/59
Copper (E)	31.00	30.00	5/16/61
Copper (CS)	31.00	30.00	5/17/61
Copper (L)	31.00	30.00	5/17/61
Lead, St. L.	10.80	11.80	12/13/60
Lead, N. Y.	11.00	12.00	12/13/60
Magnesium Ingot	36.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	81.25	74.00	6/30/61
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	11.50	12.50	1/12/61
Zinc, N. Y.	12.00	13.00	1/12/61

ALUMINUM: 99% Ingot. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. Other primary prices, pg. 279.

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.030-.037	.047-.060	.076-.096	.154-.250
1100, 3003	48.4	47.4	46.4	45.4
5052	55.8	53.0	50.8	47.8
6061-0	53.0	50.3	48.4	47.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	45.3-46.8	54.0-61.8
18-32	45.8-47.5	58.6-81.5
33-38	49.5-52.2	85.1-96.6
39-44	59.8-63.6	102.0-124.0

Screw Machine Stock—2011-T-3

Size"	7/32-5/16	11/32-23/32	3/4-1 1/16	1 3/32-1 1/4
Price	60.0	59.2	57.7	55.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.506	$2.013	$2.515	$3.017

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	147	126	145
Strip, CR	133	114	145
Rod, bar, HR	116	95	116
Angles, HR	116	95	116
Plates, HR	139	116	133
Shot, blocks	...	93	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	56.13	.....	53.61	57.32
Brass, Yellow	49.27	49.56	49.21	53.43
Brass, Low	52.15	52.44	52.09	56.21
Brass, Rod	53.17	53.46	53.11	57.23
Brass, Naval	53.94	60.25	47.75	58.10
Muntz Metal	51.94	.....	47.25	.....
Comm. Bz.	54.73	55.02	54.67	58.34
Mang. Bz.	57.71	61.54	51.27	.....
Phos. Bz. 5%	76.97	76.72	77.47	78.90

Free Cutting Brass Rod 34.77

TITANIUM

(Base 30,000 lb. f.o.b. customer's plant)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17. Plate HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; bar, HR or forged commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 32.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be ..... $ 5.00
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $70.00
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.70
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base ..... $ 1.31
Cobalt, 97-99% (per lb)...$1.50 to $ 1.57
Germanium, per gm, f.o.b. Miami, Okla., refined ..... $29.95 to $36.95
Gold, U. S. Treas., per troy oz..... $35.00
Indium, 99.9% dollars per troy oz.. $ 2.25
Iridium, dollars per troy oz.....$75 to $85
Lithium, 98% .....$9.00 to $12.00
Magnesium sticks, 10,000 lb. 57.00
Mercury dollars per 76-lb flask f.o.b. New York .....$188 to $191
Nickel oxide sinter at Buffalo, N. Y. or other U. S. points of entry, contained nickel 77.50
Palladium, dollars per troy oz..$24 to $26
Platinum, dollars per troy oz...$82 to $85
Rhodium .....$137 to $140
Silver ingots (¢ per troy oz.)..... 91.375
Thorium, per pg $43.00
Vanadium ..... $ 3.65
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ..... 32.00
No. 120 ..... 31.25
No. 123 ..... 30.50
80-10-10 ingot
No. 305 ..... 36.00
No. 315 ..... 33.75
88-10-2 ingot
No. 210 ..... 43.75
No. 215 ..... 40.50
No. 245 ..... 35.75
Yellow ingot
No. 405 ..... 27.50
Manganese bronze
No. 421 ..... 31.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95.5 aluminum-silicon alloys
0.30 copper max. 23.25-23.75
0.60 copper max. 23.00-23.50
Piston alloys (No. 132 type)...25.00-26.00
No. 12 alum. (No. 2 grade)...21.25-21.75
108 alloy 21.75-22.25
195 alloy 24.25-24.75
13 alloy (0.60 copper max.)...23.00-23.50
AXS-679 (1 pct zinc) 21.50-22.50

Steel deoxidizing aluminum notch bar granulated or shot
Grade 1—95-97½% 22.75-23.75
Grade 2—92-95% 21.50-22.50
Grade 3—90-92% 20.50-21.50
Grade 4—85-90% 19.50-20.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	27	26¼
Yellow brass	20⅝	18½
Red brass	23⅞	23⅛
Comm. bronze	24¾	24
Mang. bronze	19¼	18½
Free cutting rod ends	19½	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 28½
No. 2 copper wire 26½
Light copper 24¼
*Refining brass 25¼
Copper bearing material 24¼
*Dry Copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 28½
No. 2 copper wire 26½
Light copper 24¼
No. 1 composition 25½
No. 1 comp. turnings 25
Hvy. yellow brass solids 20
Heavy yellow brass turnings. 18½
Radiators 21
Aluminum
Mixed old cast. ..... 12½—13
Mixed new clips ..... 14½—15
Mixed turnings, dry ..... 13 —14

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire ..... 25 —25½
No. 2 copper wire ..... 23 —23½
Light copper ..... 20¾—21¼
Auto radiators (unsweated).. 16½—17
No. 1 composition ..... 21¼—21¾
No. 1 composition turnings .. 20¾—21¼
Cocks and faucets ..... 17¼—17¾
Clean heavy yellow brass .... 15¼—15½
Brass pipe ..... 17¼—17¾
New soft brass clippings .... 18¾—19¼
No. 1 brass rod turnings .... 16½—17

Aluminum

Alum. pistons and struts .... 7 — 7½
Aluminum crankcase ..... 9½—10
1100 (2s) aluminum clippings 11¾—12¼
Old sheet and utensils ..... 9½—10
Boring and turnings ..... 4½— 5
Industrial castings ..... 10 —10½
2020 (24s) clippings ..... 11 —11½

Zinc

New zinc clippings ..... 5 — 5¼
Old zinc ..... 3 — 3¼
Zinc routings ..... 1¾— 2
Old die cast scrap ..... 1¾— 2

Nickel and Monel

Pure nickel clippings ..... 56 —58
Clean nickel turnings 43
Nickel anodes ..... 56 —58
Nickel rod ends ..... 56 —58
New Monel clippings ..... 26 —26½
Clean Monel turnings ..... 18½—19
Old sheet Monel ..... 25 —25½
Nickel silver clippings, mixed. 20
Nickel silver turnings, mixed. 17

Lead

Soft scrap lead ..... 7¼— 7½
Battery plates (dry) ..... 3 — 3¼
Batteries, acid free ..... 2 — 2¼

Miscellaneous

Block tin ..... 90 —92
No. 1 pewter ..... 65 —67
Auto babbitt ..... 46 —47
Mixed common babbitt ..... 10 —10½
Solder joints ..... 15 —15½
Small foundry type ..... 9 — 9½
Monotype ..... 9¼— 9¾
Linc. and stereotype ..... 8½— 8¾
Electrotype ..... 8 — 8¼
Hand picked type shells .... 5¾— 6¼
Linc. and stereo. dross ..... 1¾— 2¼
Electro dross ..... 2½— 3

(Effective Sept. 11, 1961)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES, STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$99.50 *A2*	$121.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*	8.10 *P2*	5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.425 *A1,T8, M8* 7.525* *M8*	7.575 *W8*		8.40 *W8, S9,13*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1, P11, B9*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3, Y1*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Struthers, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*		5.50 *Y1*			5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, N. Castle, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *B4, M10*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*	$140.00 *B2*		6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

* Electro-galvanized-plus galvanizing extras

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STEEL PRICES

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		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Electro-galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.		Coke* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Thin *0.25* lb. coating in coils
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*					7.525 *B3*	9.275 *B3*	6.40 *W6, S15*	†Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price 0.75 lb. 0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb. 0.25 lb. add 65¢.		Prices are for 50 lb. base box; for 45 lb. deduct 15¢; for 55 lb. add 15¢; for 60 lb. add 30¢.
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*					7.575 *A2*					
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*					7.575 *U1*	9.325 *U1*			$9.10 *U1*	$6.25 *U1*
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*		6.775 *B3*		7.525 *B3*	9.275 *B3* 10.025 *B3**	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	$6.25 *B3*
	Worcester, Mass.									6.70 *A5*			
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*		6.775 *A7*		7.525 *A7*			Hollowware Enameling 29 ga.—*7.85 U1* at Gary; Pittsburgh; *J3* at Aliquippa; *W5* at Yorkville; *Y1* at Indiana Harbor; *W5* at Wheeling; *7.95 G2* at Granite City.		
	Canton-Massillon, Dover, Canfield, Ohio			6.875 *R1, R3*	7.50 *C19*								
	Chicago, Joliet, Ill.	5.10 *W8, A1*						7.525 *U1, W8*		6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*		7.65 *R3*	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*	6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*					7.525 *G3*	9.275 *G3*				
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*		6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*	6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1 Y1,*	$6.25 *U1, I3*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*				7.225 *E2*						
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	7.225 *A7*	6.775 *A7*	7.225 *A7*						
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3*	7.65 *R3*	6.775 *S1*	7.225 *S1†† R3*	7.525 *R3, S1*	9.275 *R3*			$9.10 *R3*	
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3*	7.50 *E3*	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3* 10.125 *U1, J3**	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	$6.25 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5*	7.50 *W3*		7.225 *W3*	7.525 *W3*	9.275 *W3*		$10.40 *W5, W3*	$9.10 *W5, W3*	$6.40 *W5*** $6.25 *W3*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*			6.775 *Y1*		7.525 *Y1*	9.275 *Y1*	6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*					8.25 *K1*	10.40 *K1*		$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*		6.775 *T2*				6.40 *T2, R3*	$10.40 *T2*	$9.10 *T2*	$6.25 *T2*
	Houston, Texas									6.65 *S2*			

* Hi Str. Low Alloy Galv. ** For 55 lb.; for 60 lb. add 15¢. †† 7.425 at Sharon; Niles is 7.225.

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STEEL PRICES

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		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.		Listing reinforcing bar prices has been suspended. Major producers now quote prices only in response to specific inquiries.		6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3, S15*		7.70 *B5*	6.725 *B3,R3, S15*	9.025 *B3,B5, S15*	8.30 *B3*	5.30 *B3*				8.00 *W6, S15*
	Claymont, Del.							5.30 *P2*	6.375 *P2*	7.50 *P2*	7.95 *P2*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Milton, Pa.	5.825 *M7*										
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*			6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Steelton, Pa.											
	Fairless, Pa.	5.825 *U1*										
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.							5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7,A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*		7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,I3*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*		7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Plymouth, Mich.	5.675 *G3*		7.90 *P3* 7.85 *P8B5H2* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8, H2* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*		7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, Y1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.											8.10 *C9*
	Sterling, Ill.	5.775 *N4*					7.925 *N4*	5.30 *N4*			7.625 *N4*	8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*		7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Youngstown, Steubenville, O.	5.675 *U1,R3, Y1*		7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1,W5, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.375 *K1*			7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*			6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*		9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*						6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*										
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*					9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*			7.825 *B2*		9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga. Jacksonville, Fla.	5.875 *A8*										8.00 *A8* 8.35 *M4*
	Fairfield, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*		8.10 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas, Sand Springs, Okla.	5.925 *S2*			6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective Sept. 11, 1961) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brooke Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.
B9 Barry Universal Corp., Detroit, Mich.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.
C19 Canfield Steel Co., Canfield, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit
H2 Hercules Drawn Steel Corp., Toledo, O.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M10 Mill Strip Products Co., of Pa., New Castle, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Div., Bliss & Laughlin, Inc., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.
S15 Seaway Steel Div., Roblin-Seaway Ind., Inc., North Tonawanda, N. Y.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery; Charge	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold-Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	9.73	9.94	9.53	13.24	.....	.....	.....	.....
Baltimore	$.10	9.60	10.16	10.16	11.35	9.70	9.95	8.65	11.80	17.48	16.48	21.58	20.83
Birmingham		8.46	10.20	10.59	9.45	8.41	8.47	8.26	13.14	18.84	16.65	22.94	22.19
Boston**	.10	10.00	10.50	11.62	12.50	9.95	10.60	10.15	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	9.45	10.20	11.95	11.85	9.55	10.05	9.60	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	9.37	10.35	10.28	11.54	9.21	9.72	9.37	10.80	17.10	16.10	21.20	20.45
Cincinnati**	.15	9.53	10.41	10.33	11.86	9.59	10.29	9.48	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	9.37[1]	10.81	11.07	11.66	9.45	10.11	9.48	11.40	17.21	16.21	21.31	20.56
Denver		11.55	12.53	13.03	13.72	11.39	11.90	11.55	12.98	.....	.....	.....	20.84
Detroit**	.15	9.63	10.61	10.65	11.91	9.58	10.29	9.68	11.16	17.38	16.38	21.48	20.73
Houston**		8.67	9.48	11.35[3]	10.23	7.91	8.31	8.08	13.10	17.50	16.55	21.55	20.85
Kansas City	.15	10.53	11.37	10.95	12.70	10.39	10.91	10.55	11.72	17.17	15.87	21.87	21.12
Los Angeles		10.35[1]	12.15	12.10	12.40	10.30	10.45	10.25	14.20	18.30	17.35	22.90	22.20
Memphis	.15	9.78	10.50	10.95	11.44	9.47	9.82	9.67	12.85	18.59	16.68	22.69	21.04
Milwaukee**	.15	9.51	10.49	10.42	11.68	9.35	9.94	9.51	11.04	17.24	16.24	21.34	20.59
New York**	.10	10.17	10.88	11.45	12.47	10.32	11.00	10.54	13.35	17.50	16.50	21.60	20.85
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	9.60	10.10	10.76	11.35	9.70	9.95	9.75	12.05	17.48	16.48	21.58	20.83
Pittsburgh**	.15	9.37	10.81	11.68	11.64	9.21	9.72	9.37	11.40	17.10	16.10	21.20	20.45
Portland		10.40	12.25	12.35	12.40	10.55	11.00	10.40	16.65	18.60	17.85	22.70	22.15
San Francisco	.10	10.75	11.75[2]	11.95	12.80	10.90	11.20	10.65	15.20	18.30	17.35	22.90	22.20
Seattle		11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.20	18.60	17.85	22.70	22.15
Spokane	.15	11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.35	17.75	17.95	21.58	22.30
St. Louis**	.15	9.57	10.73	10.66	11.74	9.43	9.95	9.59	11.43	17.48	16.48	21.58	20.83
St. Paul	.15	8.97	9.64	10.79	11.14	8.81	9.32	8.97	11.64	.....	16.69	.....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. **These cities are on order quantity pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—⅞-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 13g zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier: [2] 14 ga. & lighter. [3] 10 ga. x 48 — 120.

(Effective Sept. 11, 1961)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	F'dry.	Mall.	Bess.	Low Phos.
Bardsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	66.50	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	71.00†
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	73.00
Lyles, Tenn. *T3*	.....	.....	.....	.....	.....
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Rockwood *T3*	62.00	62.50	65.50	67.00	73.00
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	71.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31-0.69 pct phos. Add 50¢ per gross ton for truck loading charge.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4*, Toledo, *I4*, $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct; 13 to 13.5 pct; 13.5 to 14 pct, add $1. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container) — Pct

Plain finish—packaged and bulk.	43
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	43

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container) — Pct

Plain finish—packaged and bulk.	43
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	43

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)

Plain finish—packaged and bulk.	43
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	43

(Minimum plating charge — $10.00 per item. Price on application assembled to bolts.)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Bolts
Full Cartons	46	46
Machine Screws—bulk		
¼ in. diam or smaller	25,000 pcs	50
5/16, ⅜ & ½ in. diam	15,000 pcs	50

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	25.00	28.25	26.00	29.50	32.00	29.50	47.50	38.00	46.50	—	19.25–21.50	—	19.75–21.75
Billets, forging	—	37.75	38.75	39.50	42.50	39.50	64.50	48.75	57.75	26.75	29.25–26.75	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	46.75	75.75	57.50	67.25	31.50	35.00–31.50	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25–31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	40.50	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	43.50	46.75	45.00	49.50	56.75	49.50	76.75	62.25	75.25	40.25	40.25	42.50	38.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	44.25	71.75	54.50	63.75	29.75	33.25–29.75	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; Vandergrift, Pa., *U1*; Washington, Pa., *W2*, *J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Detroit, *M2*; Louisville, O., *R5*.

Strip: Midland, Pa., *C11*; Waukegan, Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville Pa., *U2*; Detroit, *M2*; Detroit, *S1*; Canton, Massillon, O., *R3*; Harrison, N. J., *D3*; Youngstown. *R5*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13*, (25¢ per lb. higher); New Bedford, Mass., *R6*; Gary, *U1*, (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7*; S. Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R5*; S. Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*, *R3*; Ft. Wayne, *I4*; Detroit, *R5*; Gary, *U1*; Owensboro, Ky., *G5*; Bridgeport, Conn., *N8*; Ambridge, Pa., *B7*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Newark, N. J. *D2*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*; Detroit, *R5*; Reading, Pa., *C2*; Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*; S. Chicago, *U1*.

Plates: Ambridge, Pa., *B7*; Baltimore, *E1*; Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Vandergrift, Pa., *U1*; Gary, *U1*; Claymont, Del; *P2*.

Forging billets: Ambridge Pa., *B7*; Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*; Detroit, *R5*; Munhall, Pa., S. Chicago, *U1*; Owensboro, Ky., *G5*; Bridgeport, Conn., *N8*; Reading, Pa., *C2*.

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

	Discount Hex	Square
Full Cartons	46	57
Bulk		
¼ in. diam or smaller	25,000 pcs	
5/16 or ⅜ in. diam	56	60
	15,000 pcs	
	56	60

Rivets

	Base per 100 lb
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

NOTE: Ferroalloy prices are published in alternate issues.

TOOL STEEL

F.o.b. mills

W	Cr	V	Mo	Co	per lb	AISI
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1960 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

(Effective Sept. 11, 1961)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
	Col	Col	Col	Col	Col		
Alabama City *R3*	173	187	....	212	193	9.00	9.55
Aliquippa *J3****	173	190	....	....	190	9.00	9.675
Atlanta *A8***	173	191	....	212	197	9.00	9.75
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Chicago *W7*	173	.....	.....	.....	.....	9.00	9.55†
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dav. *M4***	175	192	....	214	198	9.10	9.80
Donora Pa. *A5*	173	187	....	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	....	212	193	9.00	9.5a
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192	....	217	198	9.25	9.80†
Jacksonville *M4*	175	192	....	214	198	9.10	9.80††
Johnstown *B3***	173	190	177	....	196	9.00	9.675
Joliet Ill. *A5*	173	187	....	212	193	9.00	9.55
Kokomo *C9**	175	189	....	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	....	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass. *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	.....	.....	213	9.95	10.50
Rankin Pa. *A5*	173	187	.....	.....	193	9.00	9.55
So. Chicago *R3*	173	187	.....	.....	193	8.65	9.20
S. San Fran. *C6*	.....	.....	.....	236	.....	9.95	10.50
Sparrows Pt. *B3***	175	.....	.....	215	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only. †† 0.115¢ zinc.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $290 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.50¢ per lb.

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.6
Chicago	140.0
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

COKE

	Net-Ton
Furnace, beehive (f.o.b.)	
Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Chattanooga, Tenn.	30.80
Ironton, O., f.o.b.	30.50
Detroit, f.o.b.	32.00
New Haven, f.o.b.	31.00
Kearny, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

IMAGINATION IN PERFORATED MATERIALS

New materials, new techniques have opened broad horizons for perforated materials in industrial design.

Texturing of perforated metals offers a dramatic opportunity to increase visual appeal while adding structural strength.

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You too should be using KROIL every day. Try it on money-back basis. Gallon $4.35; with Kroiler trigger squirt gun (shoots a drop or a stream 15 feet, if desired) $5.25; f. o. b. our factory.

KANO LABORATORIES 1091 Thompson Lane, Nashville 11, Tenn.

KANO LABORATORIES

FERROALLOY PRICES

NOTE: Prices of Boiler Tubes, Clad Steel, C-R Spring Steel, Electrical Sheets, Electrodes, Electroplating Supplies, Metal Powders, Rails and Track Supplies, and Refractories are published in alternate issues.

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 65-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	33.25
0.05% C....	34.00	1.00% C....	33.00
0.10% C....	33.75	1.50% C....	32.75
0.20% C....	33.50	2.00% C....	32.50

3-5% C, 53-63% Cr, 2.5% max. Si... 26.00
4-6% C, 58-63% Cr, 3-6% Si..... 22.50
5-8% C, 58-63% Cr, 3-6% Si..... 22.50
6-8% C, 50-56% Cr, 4-7% Si..... 22.00
4.00-4.50% C, 60-70% Cr, 1.2% Si.. 28.75
0.025% C (Simplex) 31.50
0.010% C max, 63-66% Cr, 5-7% Si. 32.50
0.010% C max, 68-71% Cr, 2% Si max 31.50
0.25% C max 33.50

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed delivered, ton lots, 97.25% min. Cr, 1% max. Fe.
0.10% max. C $1.29
9 to 11% C, 88-91% Cr, 0.75% Fe... 1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (¼" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.
Carloads $1.15
Ton lots 1.17
Less ton lots 1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.)
Carloads, delivered, lump, 3-in x down, packed.
Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	22.50	14.60
Ton lots	30.45	16.05
Less ton lots	33.40	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.
Carloads, bulk 24.00
Ton lots 27.95
Less ton lots 29.45

Calcium-Maganese—Silicon

Cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.
Carloads, bulk 23.00
Ton lots 26.15
Less ton lots 27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.
Ton lots 21.15
Less ton lots 22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.
Carload lots 18.45
Ton lots 19.95
Less ton lots 21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.
Carload bulk 19.20
Ton lots to carload packed 21.15
Less ton lots 22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn. Carload lots, bulk.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	11.00
Houston, Tex.	11.00
Johnstown, Pa.	11.00
Lynchburg, Va.	11.00
Neville Island, Pa.	11.00
Sheridan, Pa.	11.00
Philo, Ohio	11.00
Rockwood, Tenn.	11.00
S. Duquesne	11.00

Add or substract 0.1¢ for each 1 pct Mn above or below base content.
Briquets, delivered, 66 pct Mn:
Carloads, bulk 13.70
Ton lots packed in bags 16.10

Spiegeleisen

Per gross ton, lump, f.o.b., 3% Si max.

Mn	Palmerton, Pa. 10 lb, pig	35 lb, down	Neville Is., Pa. 35 lb
16-19%	.. $98.00	$96.00	$100.50
19-21%	.. 100.00	98.00	102.50
21-23%	.. 102.50	100.00	105.50

Manganese Metal

2 in. x down, cents per pound of metal delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.
Carload, packed 45.75
Ton lots 47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.
Carloads, bulk 34.25
Ton lots, palletized 36.25
250 to 1999 lb 39.00
Premium for Hydrogen - removed metal 0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 24.00

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	(Bulk) 37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	31.10	33.90	35.10
0.30% max. C	29.80	32.60	33.80
0.50% max. C	28.50	31.30	32.50
0.75% max. C, 80.85% Mn, 5.0-7.0% Si	27.00	29.80	31.00

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.3¢ f.o.b. shipping point.
Carloads bulk 11.60
Ton lots, packed 13.25
Carloads, bulk, delivered, per lb of briquet 14.00
Briquets, packed pallets, 2000 lb up to carloads 16.40

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, frieght allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe ..	22.95	21.65
98% Si, 1.0% Fe	21.95	20.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.
Carloads, bulk 8.00
Ton lots, packed 10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	13.50	75% Si....	16.90
65% Si....	15.75	85% Si....	18.60
	90% Si....	20.00	

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.
Openhearth 3.20
Crucible 3.30
High speed steel 3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 1999 lb...	2.40	3.30	4.55

(Effective Sept. 11, 1961)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y. per lb.
Carloads, bulk ..... 9.85¢
Ton lots ..... 11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.63

Ferrocolumbium, 58-62% Cb, 2 in. x D, del'd per lb con't Cb
Ton lots $3.45
Less ton lots 3.50

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta $3.40

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.89

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton $120.00
10 tons to less carload $131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Vanadis, O., O., freight allowed, ton lots, per lb contained Ti $1.35
Less ton lots (200 lb and up) $1.37

Ferrotitanium, 30% low carbon, 0.10% C max., 27-32% Ti, Vanadis, O., freight allowed, per lb contained Ti, ton lots $1.35
Less ton lots (200 lb and up) $1.40

Ferrotitanium, 1-3% Carbon, 17-20% Ti, f.o.b. shipping point, freight allowed, carload per net ton $250.00
Ton lots $260.00

Ferrotungsten, ¼ x down packed per pounds contained W, ton lots delivered ..... $2.45 (nominal)

Molybdic oxide, briquets per lb. contained Mo, f.o.b. Langeloth, Pa. $1.62
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.59

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.
Carload, bulk lump ..... 18.50¢
Ton lots, packed lump ..... 20.50¢
Less ton lots ..... 21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .... $1.38

Zirconium silicon, per lb of alloy 35-40% del'd, carloads, bulk.. 26.25¢
12-15%, del'd lump, bulk-carloads ..... 9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Ferro Zirconium Boron, Zr 50% to 60%, B 0.8% to 1.0%, Si 8% max., C 8% max., Fe balance, f.o.b. Niagara Falls, New York, freight allowed, in any quantity per pound ..... 30¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 18.25¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots... $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up
10 to 14% B ..... .85
14 to 19% 1.20
19% min. B 1.50

Grainal, f.o.b. Cambridge, O., freight, allowed, 100 lb & over
No. 1 ..... $1.05
No. 79 ..... 50¢

Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd
Ton lots (packed) $1.46
Less ton lots (packed) 1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

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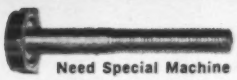

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SONORAY detects and locates flaws. SONORAY measures thickness and detects metallurgical variations.

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- portable
- low cost

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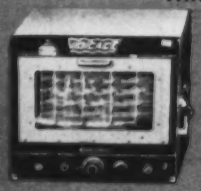

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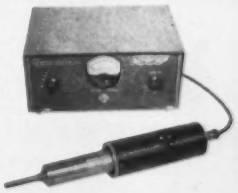

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No. 59 Toledo SSSC Tie Rod Press; Cap. 345-tons; 10" stroke

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ELECTRICAL POWER EQUIPMENT

SLIP RING MOTORS

HP	RPM	MAKE	VOLTS	TYPE
2500	257	G. E.	6600	MT-28
1000	1200	Al.-Ch.	4000	ANY
1000	900	Al.-Ch.	2300	ANY
700	720	G. E.	440	I-M
600	1800	G. E.	4160	M-6345
500	1200	G. E.	440	M-6345Z
400	1200	West.	2300	CW
400	720	G. E.	440	MT-573Y
350	1800	Al.-Ch.	2300	ARYW
300	900	G. E.	440	IM-17

MOTOR GENERATOR SETS

KW	MAKE	A.C.V.	D.C.V.
1750	G. E.	4160/2300	250/300
1250	West.	4160/2300	250
1000	West.	4160/2300	250
750	G. E.	4160/2300	250
600	G. E. (3 unit)	2300/440	125/250
500	G. E.	2300	250
400	Al.-Ch.	2300/440	125/250
250	G. E.	2300	250
200	G. E.	2300	250
150	West.	440	250

D. C. MOTORS

HP	RPM	MAKE	VOLTS	TYPE
1500	300	West.	250	TEFV
850	250/500	West.	250	QM
600	250/500	G. E.	600	DBL. ARM.
500	210	G. E.	250	MCF
400	1150	REL.	250	T-1970
400	300/900	G. M.(2)	250	D4D
300	575/1150	West.	250	CB-509
200	700	West.	250	8K-201
150	380/1000	G. E.	250	MCF
150	1150	G. E.(2)	250	RC-37

SQUIRREL CAGE MOTORS

HP	RPM	MAKE	VOLTS	TYPE
1500	1800	Al.-Ch.	2300	Ventilated
1250	3600	Al.-Ch.	4000	DP/PF
800	600	West.	2300	CS-44
600	600	West.	2300	CS-12
500	1800	G. E.	2300	KT-565Y
500	1200	G. E.	2300	FT-567
350	1200	West.	440	CS-3255-6H

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Chicago Sales Reflect Fall Gains

Used machinery dealers in the Chicago area are optimistic over fourth quarter prospects.

Already, sales are starting to pickup. Any good increase in defense buying could boost equipment prices.

■ Emerging from a slow summer period, Chicago used machinery dealers report considerable optimism over the final quarter. But at the moment, this is not spelled out with any strong sales gains.

Movement of equipment in the lower price categories has been noticeable for several weeks. It has been gaining at a mild rate. Some used tool dealers are taking advantage of this movement to reduce stocks of older tools. But they tend to replace them with later model equipment that will have to be marketed at higher prices.

No Pattern—There is no clear-cut pattern to the gains thus far. Inquiries continue to run well ahead of actual sales. And buyers are still fairly demanding on prices and delivery times.

Mild gains in rebuilding, sheet metal equipment, and even on the heavy equipment side are reported.

What does this mean for the fourth quarter? Most dealers feel the present situation represents a lull that precedes the advances to come in the final period. They say end-of-the-year buying will be concentrated on heavier equipment. There is already some indication of this when sales that had been pending since early this year began to jell last week.

In Demand—The range of purchases where the dealer is able to close a sale is widespread. Lathes, milling machines, radials, sheet metal equipment, and light presses have all figured in recent sales.

Another factor in the fall outlook: While defense contractors have more to spend, they haven't spent much of it thus far. This suggests that they may come into the market for tools in the very near future.

Also drawing interest is the fact that tool room equipment in Chicago has started moving at a slightly quicker pace. Job shop buyers have, in recent weeks, placed inquiries and orders for equipment they were considering last spring.

This is no pronounced upward trend. But it does suggest that money is becoming somewhat easier.

Firmer Prices—Last July prices were soft. Now they appear to be firming. And there's speculation that additional defense buying could bring price advances.

One fact remains certain: Gains in recent weeks have been in light or older equipment. Of course, heavy tools never slumped as badly as the light equipment in this area.

There has been a steady trickle of out-of-area sales of heavy equipment through the entire slump period. And this continues.

In only one major category of defense buying has there been any noted gain in demand for used machinery. Electronics buyers seem to have felt the defense speedup the most. They're already in the market and buying.

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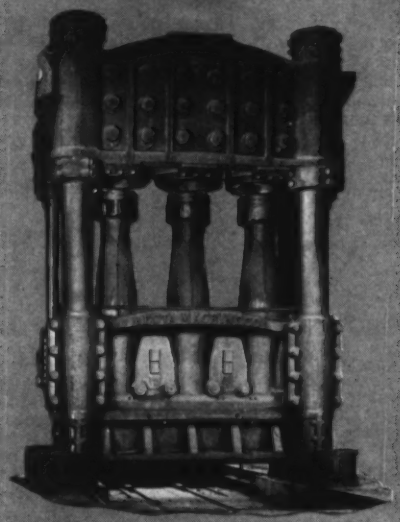
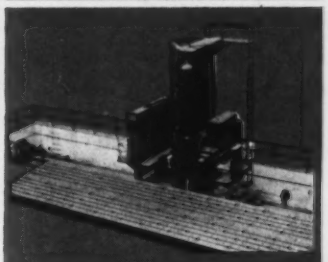
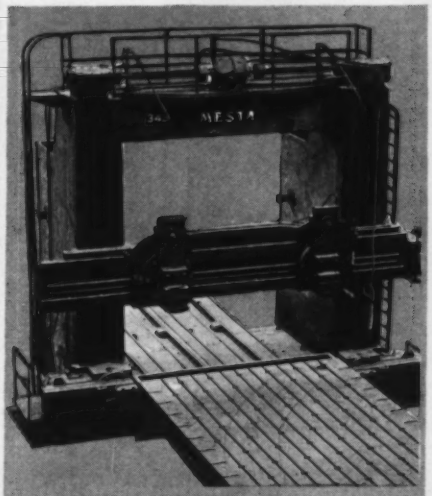


14,000 Ton MESTA PRESS 3 cyl. Water, 18' Daylight, Dist. Bet. Cols. 19'x8'6", Stroke 7'6", 6300 PSI Hydro-Pneumatic Operation Transf., Starting Equip., & all Misc. Aux. Equip.

6,500 Ton UNITED ENGINEERING Water PRESS, Stroke 10', Daylight 19'4", Dist. Bet. Cols. 18'5"x7'4", 4500 PSI Hydro-Pneumatic Accumulator System with Pumps, Pressure Vessels, Transf. Starting Equip. & all Misc. Aux. Equip.

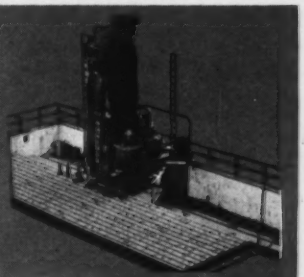


INGERSOLL 12'x46' Universal Traveling Housing Type Boring & Milling Machine.

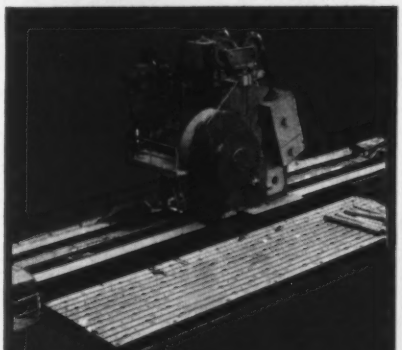


MESTA PLANER 14½'x14'x42'. Four Heads, 150 HP Variable Voltage Drive.

NILES PLANER 15'x14'x36', Four Heads, 150 HP Variable Voltage Drive.



MORTON Universal Combination, Boring, Drilling, Milling Machine and Draw Cut Planer. 13'x46', 10¾" Spindle.

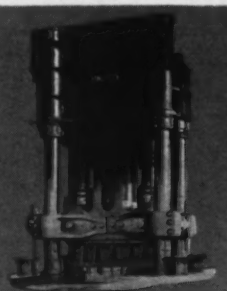


NEWTON 120"x46' Combination Rotary Planer & Cold Saw.

6,500 Ton MESTA PRESS Down Moving Hydraulic Bending, 4 Rod Type, with Self Contained Pumping Units, Bed arranged with hydraulic front to rear travel to facilitate loading and unloading if desired. Bed 15'x15', ram 7'16"x 16' stroke 60", daylight 84", diam. of rods 24".

3,000 Ton BLISS Hydraulic PRESS. CLEARING Model H-3000-60, 18" Stroke, Bed 60"x7'4", 1952.

No. 1301-5 BLISS Brass & Alum. Slab SHEAR. Line Capacity 2¼"x20", 2"x 24" Brass with Pack Storage Conveyor. New 1952, Never Used.



14,000 Ton UNITED ENGINEERING PRESS, 4 col., 2 Ram Type Water, Stroke 10', Dist. Bet. Cols. 23'x11'6", Daylight 22' 4500 PSI Hydro-Pneumatic Accumulator Syst. with Pumps, Pressure Vessels, Transf., Starting Equip. Misc. Aux. Equip.

LIQUIDATION PLATE ROLLING MILL

Mill Facility, Equipment and Material of the former Phoenix Steel Corp. Plant located at Harrisburg, Penna.

LOCOMOTIVES

(1) 20 Ton Plymouth Diesel 36" Ga. Cummins

(1) 20 Ton Plymouth Gasoline 36" Ga LeRoi

MILL DRIVE

3000 HP General Electric Slip Ring Motor Reduction Gear Mill Drive 78 RPM OUTPUT

(1) 3.000 HP General Electric Slip Ring Motor, 2,300 Volt, 60 Cy., 3 PH., 356 RPM with Comp. panel, and lub. system, air wash sys. Coupled to Mesta 4.6:1 Red. Gear-output speed 78 RPM.

ELECTRIC ARC MELTING FURNACE

HEROULT Model 15 Electric Arc Melting Furnace. Shell Diameter 14'-0"; Inside Diameter 12'-0" Side Charge. Cold scrap charge 30.000#/40.000#. Electrode size 14" diameter x 60" long. Transformer General Electric 6.000 KVA Primary Voltage 13,200/26,400 Sec. 265/92 volts; built in reactor. GE Automatic Control Panel. Westinghouse tot. encl. drawout switch-gear. With approx. 160 spare electrodes and nipples. door frames, rings, motors, etc. S/N 236 Mfd. Heroult Div. U. S. Steel Corp.

SHEARS

1.000 Ton HOT UPCUT SLAB SHEAR Capacity 6" thick x 60: wide, stroke 12½", 8 cuts per min, 32" hyd. hold down cylinder. 1320# w.p., 600 HP Bingham Pump and motor drive. Auto. Length of cut gauge, adj. from 30"/120" length of cut. Approach and runout tables, crop kickoff, operator pulpit, relate and control panels. Man. Pittsburgh Engineering and Machine Co.—1949.

TRANSFORMERS

(1) 7.500 KVA Wstghse. 66.000 Pri. 13,800 Sec 3 PH 60 S/N 4089566 Yr. 1948.

(3) 2.000 KVA GE 13.200/26,400 Pri. 2.400/4.150Y. Sec. 1 PH 60 S/N 2871432; 2871433; 287140.

(3) 667 KVA GE 2,300/4,000Y Pri. 460 Sec. 1 PH 60 S/N 4497213; 4497214; 4497215.

ROLLING MILL EQUIPMENT
SLAB EDGER MILL

(1) Slab Edger Mill, Pittsburgh Engr. Co., S/N 48147 (New 1949). Capacity 72" x 18" thick slab, Roll Size (2) 43" Diameter x 24" Working Surface—Alloy Steel. Motor Drive 1,000 HP & reduction gear. Complete with starter, Controls, Etc. (1) MG Set, General Electric, 1,000 KW, Generator-600 V DC 1667 Amperes. Motor—1,400 HP 2300/3/60.

(1) Birdsboro 34" Blooming and Slabbing Mill, 72" Wide, 2 High, Reversing, 28" x 66" Ingot, Minimum Thickness 2", Maximum Lift 28", Maximum Ingot Weight 30,000# (Approx.), Approach Table 38' Long, Runout Table 26' Long. Both Tables Motor Driven 50 HP 230 V DC; Hydraulic Slab Shear, Pittsburgh Engr. Co., S/N 48148, New 1949; Capacity 1,000 Tons, 6" Thick x 60" Wide Steel Slab (Hot); Hydraulic Pump, 8 Stage Bingham, 500 spm @ 1,440 psi, Motor Drive—600 HP 2,300/3/60, Starters, Controls, Etc.

(1) Birdsboro 126" Plate Rolling Mill, 126" Wide, 3 High 34" Dia. Rolls, 15" Maximum Lift, Minimum Thickness 3/16", Maximum Slab or Ingot Size 115" Wide x 15" Thick, Maximum Weight 22,000# (Approx.). Tilting Tables, Front and Back; 3,000 HP Electric Motor Mill Drive. Runout Table 54' Long to Plate Leveller; Plate Leveller, 11 Driven Rolls (5 Upper and 4 Lower), 148" Between Housings. Motor Drive—50 HP 230 V DC.

(1) Birdsboro 89" Plate Rolling Mill, 89" Wide, 3 High, 25½" Dia. Rolls, 15" Maximum Lift, Minimum Thickness 3/16", Maximum Slab or Ingot Width 72", Maximum Weight 4,400# (Approx.). Tilting Tables Front and Back; Runout Table 45' Long to Plate Levellers: 2 Plate Levellers, 6 Upper and 5 Lower Work Rolls. Motor Drive—55 HP 230 V DC.

(1) Birdsboro 42" Universal Plate Rolling Mill, 2 High, Reversing, Maximum Lift 26", Maximum Width 42", Minimum Width 7", Minimum Thickness ¼", Maximum Weight 14,000# Ingot (Approx.). Vertical Side Rolls each Side of Mill Housings for Rolling Plate Width. Front Mill Table 45' Long, Back Mill Table 33' to Plate Leveller: Plate Leveller, 9 Work Rolls (4 Upper and 5 Lower), Motor Drive 75 HP 230 V DC. Plate Shear, 48" x 2" Thick (Cold), Motor Drive 50 HP 230 V DC.

OVERHEAD TRAVELLING CRANES

(1)	150 Ton/40 Ton	Morgan	Ladle Crane 59'-6" Span
(1)	100 Ton/25 Ton	Wellman	Ladle Crane 59'-6" Span
(1)	40/25 Ton	Milwaukee	Crane (1951) 59'-6" Span
(1)	25 Ton	Milwaukee	Crane (1949) 68'-0" Span
(1)	20 Ton	Milwaukee	Crane 69'-4" Span
(2)	20/5 Ton	Shaw Box	Crane 65'-0" Span
(1)	20 Ton	Milwaukee	Crane (1949) 46'-10" Span
(1)	15 Ton	Northern	Crane 68'-3" Span
(2)	15 Ton	Morgan	Crane 64'-6" Span
(1)	10 Ton	Alliance	Crane 70'-0" Span
(1)	10 Ton	P & H	Crane 68'-3" Span
(1)	10 Ton	Shaw Box	Crane 69'-4" Span
(1)	10 Ton	Shaw Box	Crane 64'-6" Span
(1)	10 Ton	Alliance	Crane 64'-6" Span
(1)	10 Ton	Milwaukee	Crane 65'-0" Span
(2)	10 Ton	Alliance	Crane 60'-0" Span
(4)	10 Ton	Alliance	Crane 56'-6" Span
(1)	5 Ton	Alliance	Crane 64'-6" Span
(2)	5 Ton	Alliance	Crane 61'-6" Span
(1)	5 Ton	Cleveland	Crane 56'-6" Span
(1)	5 Ton	Northern	Crane 44'-6" Span
(2)	5 Ton	Alliance	Crane 40'-4½" Span
(1)	5 Ton	Phoenix Stl	Crane 35'-0" Span
(1)	15 Ton	Milwaukee	Bridge Only (1949) 70'-0" Span

Spare Trolleys, 5 ton, 10 ton 15 ton; contractor panels; cab controls; Resistanee banks.

ROLL LATHES

(1) Pond—60" Face Plate; 41'-6" Centers; 12' tool holder; with floor plate milling attach.

(1) Fifield—60" Face Plate; 14'-0" Centers with floor plate milling attach.

(1) Garrison—40" Face Plate; 12'-8" Tool Holder; 12' Centers; 10 HP Drive.

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Capacity 96ff wide x 7'16" thick plate. Arbor 12" diameter, circular cutters 16" diameter x 2 3/8" face. Cutting speed adjust to 62 fpm Drives 65 HP, 250/1.000 RPM, 230 volt, DC., with operator's pulpit, controls, etc. Mfd. by Monarch Tool & Die Co., Milwaukee, 1949. Approx. wt. 80.000#.

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Rated 15/20 tons hr. Shell dia. 8'-11"; hearth dia 7'-0"; stack height 40' (12) water cooled tuyeres 3.81" dia. Heat exchanger for preheating 12,000 CFM to 950/1000°F. with Allis Chalmers blowers, motors, controls. Charging equipment, cyclone dust collector; piping, valves, operating and control instrumentation. Installed 1954.

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50 KW; 80 KW ; 100 KW 2 station 9600 cy.—
200 KW 3000 cy. TOCCO Induction Heating and Brazing Units
15 KW GIRDLER Dielectric Heater
20 KW THERMONIC Induction Heater 2 station
20 KW ECCO Induction Heater

• CRANES

30 TON—83' Span, L & H, Very Late
5 TON—50'—AC.W/300'
"A" Frame Run Way, M.G. Set—Magnet—Bucket.

• INDUCTION MELTING FURNACES

175 KW AJAX Induction Mltg. Installation Ideal for non-ferrous work. With 2 lift coils, can add tilt fces for steel.
500KW AJAX Mltg. Installation 960 cy.

30 KW VACUUM Melting, Complete—Like New
200 KW 960 cycle. 1000# steel
Large stock gas-oil-elec. heat treat units

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36x42 WHEELABRATOR w/loader *available*
48x42 WHEELABRATOR w/loader *for all*
48x48 WHEELABRATOR w/loader *machines*
48x72 WHEELABRATOR w/loader
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72" WHEELABRATOR Swing Table

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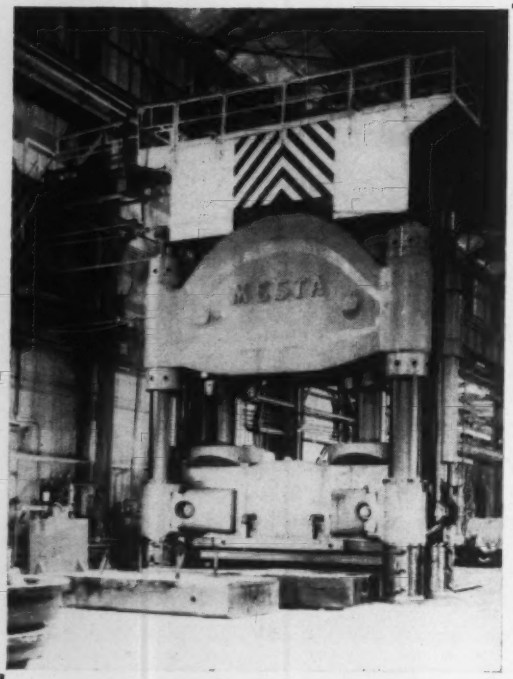

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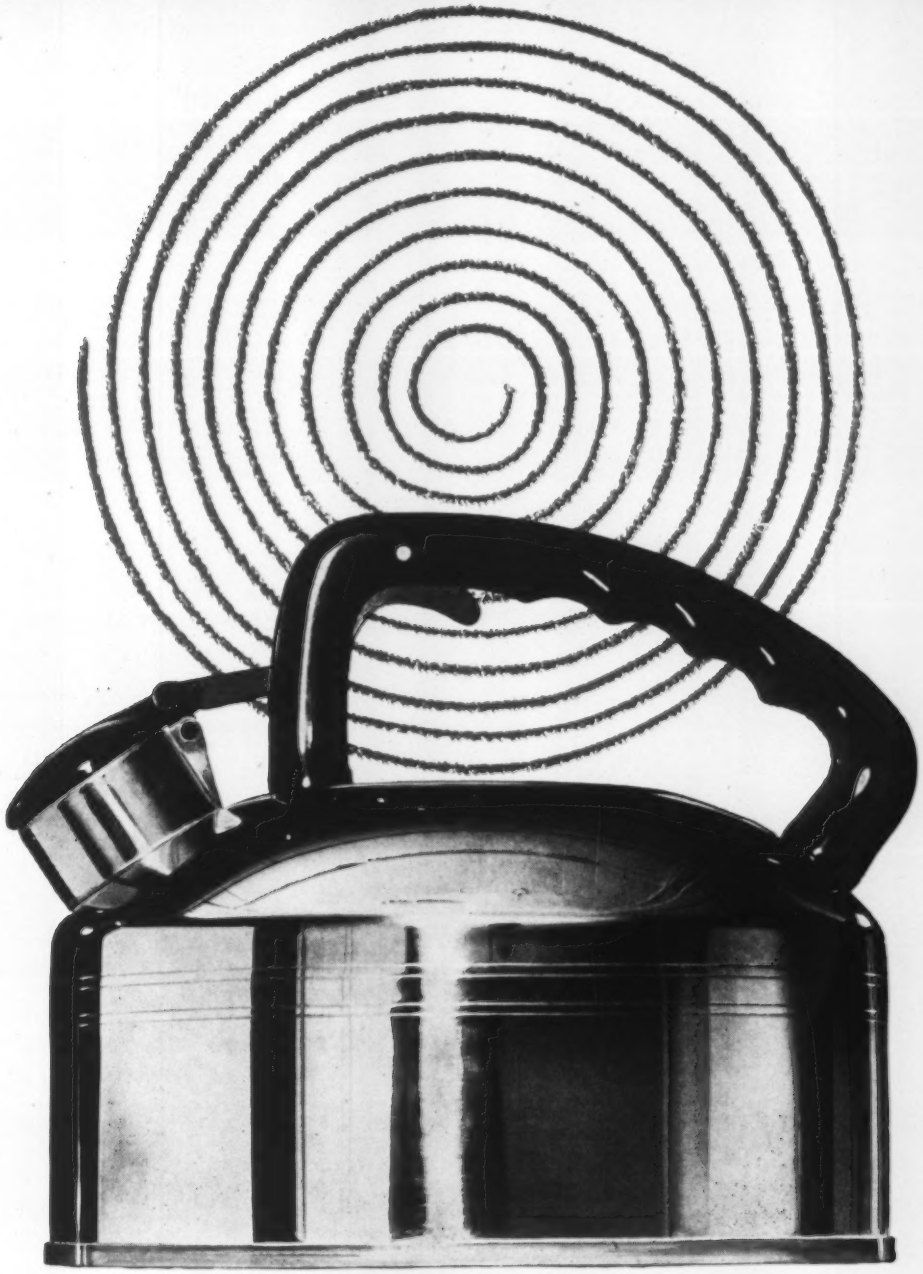

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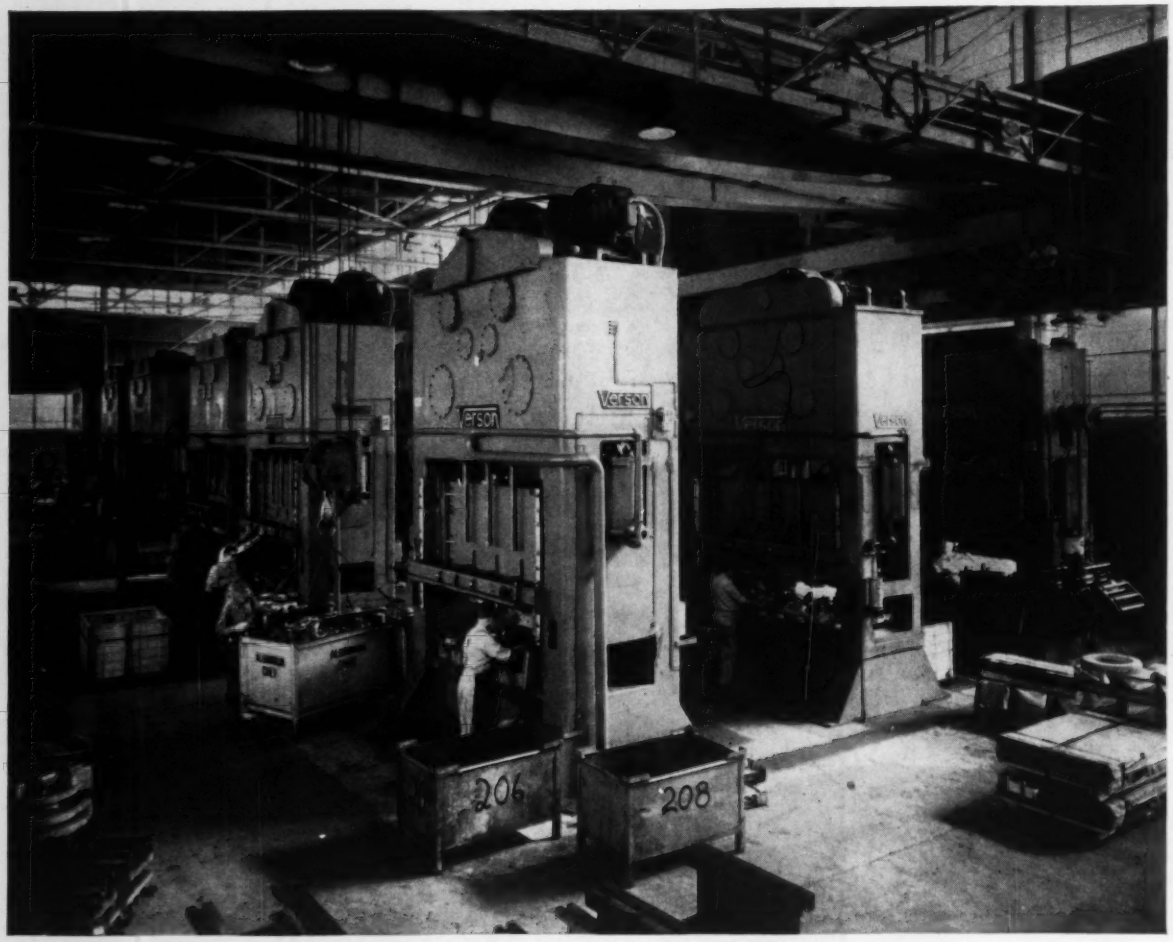

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